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Herr Otto Schulz gliding at Rossitten, Germany

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NUMBER 3

SPECIAL FEATURES

THE NAVY AIR BILL

THE CURTISS FALCON

APPLICATION OF MODERN AERODYNAMIC THEORY

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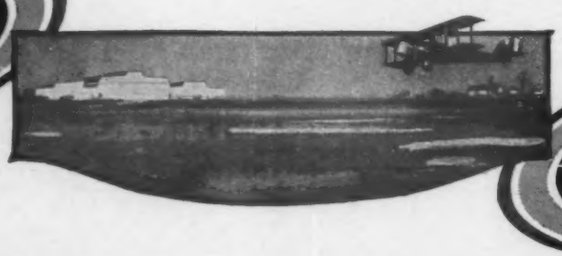

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JULY 19, 1926

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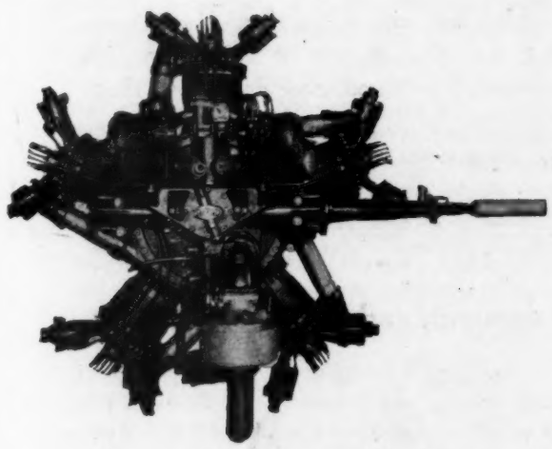

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VOL. XXI JULY 19, 1926 NO. 3

National Air Races

ALL INDUSTRIES need to get together but there is probably no industry in which this fact is more pronounced than in the aeronautic trade. The number of people engaged in the trade are relatively few and they are scattered from coast to coast. They are, however, migratory in their habits and the flier from California is apt to have mutual acquaintances with the flier in Maine; in fact, they are apt to find that they have trained in the same camp in Texas. This common ground makes easier the discussion of the many problems which beset an industry as new as aeronautics. Some annual gathering is almost essential and the National Air Races are more and more becoming this focal point.

From the point of view of the man in the trade the National Air Races can be regarded from two points of view. In the first place and most important, he will run up against a lot of old acquaintances and he will make a lot of new ones. Personal contacts and knowledge of what the other man is doing are always valuable and often make an immense difference in an important matter. Also the other man finds out what you are doing and thus attendance at an air meet is of great advertising value. Furthermore, almost all the new planes which have been put out during the course of the year appear at the National Air Races. To see these machines actually fly and to be able to study the various little gadgets which do not appear in any description is alone worth the trip to the races.

This year the races will have an added attraction as the Philadelphia Sesqui-Centennial will be decidedly worth visiting. With the meet entirely under civilian control and with the preparations which are being made to entertain the visiting air enthusiasts, there should exist a convivial atmosphere which will make the air meet very well worth attending.

On Reliable Performance Figures

DESCRIPTIONS OF new planes are almost always accompanied by performance figures. Those who believe everything that they see in print accept the figures and admire the wonderful qualities of the new planes. The more cynical readers refuse to believe any of the figures even when vouched for by reputable concerns. The truth is that the figures are often unreliable. As a rule the smaller builders do not run any accurate performance tests and, being optimistic, they tend toward exaggeration. The larger manufacturers usually run tests but it is very difficult for them to publish the accurate figures as they do not look well in comparison with the exaggerated figures which are often submitted.

This situation is obviously unfair to the conscientious manufacturer. It is hard for the prospective purchaser to know what to believe and it makes it very difficult for the student of aeronautics to compare different designs. There are so many reasons in favor of reliable performance figures that it is hard to see why the buyer does not demand them instead of merely accepting the manufacturers' statements. The N.A.A. and various universities which give aeronautical courses are ready to run tests, while the Army and Navy will test planes with potential military value.

There are really only two tests which are obtainable with absolute accuracy. The first is the speed test and the second is the climb test, with and without load. Low speed, take-off and cruising speed depend so much on piloting, wind and ground conditions that they are difficult to standardize. The speed test and the load climb test alone will, however, give a very good idea of the performance of the machine.

There is such a great need for reliable data that all those who have gone to the expense of building a plane should take on the very slight additional expense of having the plane tested for performance. Every experienced pilot realizes the importance of the flying qualities of a plane but he is equally interested in performance. The days of selling on pure Blarney are rapidly going and the manufacturer who supplies official performance figures is in a strong strategic position.

All the Sad Young Ideas

THERE IS nothing more fascinating for the man who is interested in mechanical things than to have an idea which he can glorify and call an invention. Almost all of us "invent" something from time to time and spend exciting hours playing with this child of our brain. It is really pathetic to find how few of us have the ability and the tenacity of purpose which is necessary in order that these nebulous conceptions of the human mind may be materialized and developed into inventions which are the standard bearers of human progress.

The airplane was "invented" by the mythologists of ancient Greece, but it took centuries for sufficient knowledge to accumulate so that the courage and perseverance which animated the Wright's could produce a machine which actually flew. Following the first flights of the Wright brothers there was a long period during which little was known about the laws governing flight. As a result, planes were built on trial and error and it was difficult to predict what a plane would do until it had actually flown. During this period, almost anyone with a fair amount of intelligence and a lot of enthusiasm and ingenuity could build a plane in his back yard which might be just as good as anyone else's.

With continued research in the wind tunnel and the verification of theories by actual full scale tests, there has grown up a vast amount of knowledge of aerodynamic principles. As a result, the day of the back yard airplane builder is rapidly passing. Today, knowledge and experience exist and if a plane is to be better than others the designer must possess this knowledge and experience.

The Navy Air Bill

A Five-Year Construction Policy, Providing for 1614 Airplanes, Decided Upon.

THE NAVY AIR BILL, recently signed by President Coolidge, contains a five year program for the development of Naval Aviation and clauses which define the status of Naval fliers. Furthermore, it remedies some of the inequalities which were caused by officers staying in an air unit and not taking details in other branches of the Navy. An assistant Secretary of the Navy is provided for and Professor Warner of M.I.T. has already been chosen to fill this post. As far as the procurement of equipment is concerned, the bill specifically authorizes that such material may be procured from any Navy Yard or Government factory provided that, in the letting of contracts under competitive bidding, the government feels that there is collusion among the bidders or that the prices called for are excessive.

However, since the passage of the Navy bill, the Vincent bill, which governs procurement, has been included as an amendment to the Army Aviation Bill and, as far as procurement goes, the very specific details as to design competitions and the letting of contracts which are contained in the amended Army Bill will apply to naval air procurement as well. The Army Bill must, therefore, be studied if the Navy's method of procedure is to be understood.

Five Year Program

The following allocations have been made for construction during the next five years:

For Fiscal year Ending June 30	*Number of Planes*	*Appropriation*
1927	235*	$12,285,000.
1928	313	$16,223,750.
1929	335	$17,582,500.
1930	357	$18,941,250.
1931	374	$20,046,250.
Total	1614	$85,078,750.

*This is in addition to the 78 planes already appropriated for.

For the year 1932 and thereafter planes, not to exceed 333 in number nor to cost more than $17,476,250., are provided for, it being estimated that this is the number of planes required to keep the standard up to one thousand.

Two airships of 6,000,000 cu. ft. each are authorized at a cost of not more than $3,000,000. for both ships. The construction of one experimental metal-clad airship is also provided for.

Building By the Navy

The Secretary of the Navy is authorized to build at any Navy yard or naval factory any of the aircraft, spare parts, or equipment should it reasonably appear that the firms, bidding for the construction of aircraft, spare parts, or equipment have entered into any combination or understanding, the effect of which is to deprive the Government of fair competition in letting contracts. Or should it appear that any firm being solely in position to manufacture the particular type or design of aircraft, etc., bidding on such has named a price in excess of cost of production plus a reasonable profit.

Personnel

Regarding naval flying personnel, the term "Naval Aviator" is defined in considerable detail in the Bill. To qualify, an officer must have at least 75 hr. solo flying heavier-than-air or 200 hr. flying lighter-than-air besides passing certain prescribed courses.

When a line officer of the Navy is to be detailed to the command of a Navy aviation school or of a Navy air station or of a Navy air unit organized for flight tactical purposes he must be a naval aviator.

Line officers detailed to command of aircraft carriers or aircraft tenders must be naval aviators or naval aviation observers who are otherwise qualified.

Any officer of the Navy, line, or staff of the permanent rank or grade of commander or lieutenant commander, at the time of the passage of the Bill who has specialized in aviation for such a period of time as to jeopardize his selection for promotion or advancement to the next higher grade or rank under existing provisions of law and whose service in aviation has been in the public interest shall be so notified by the Secretary of the Navy and at his own request be designated as an officer who will be carried as an additional number in the next higher grade or rank not above the grade of captain if and when promoted or advanced.

When a line officer of the Marine Corps is to be detailed to the command of a Marine Corps aviation school or of a Marine Corps air station or of a Marine Corps air unit organized for flight tactical purposes he must be a Marine Corps aviator.

On and after July 1, 1928, the number of enlisted pilots in the Navy must not be less than 30 of the total number of pilots employed in the Navy on aviation duty.

Assistant Secretary

The details relating to the Assistant Secretary for Aviation are here quoted in detail from the text of the Bill:

To aid the Secretary of the Navy in fostering naval aeronautics, and to perform such functions as the Secretary may direct, there shall be an additional Assistant Secretary of the Navy, who shall be appointed by the President, by and with the advice and consent of the Senate, and whose compensation shall be fixed in accordance with the Classification Act of 1923. He shall, under the direction of the Secretary of the Navy, be charged with the supervision of naval aeronautics and the coordination of its activities with other Governmental agencies, and, in addition, such other duties as may be assigned to him by the Secretary of the Navy. There shall be detailed to his office from the Bureau of Aeronautics such number of officers and civilian employees as may be authorized by the Secretary of the Navy.

Henry Miller Photo

Planes of the Japanese Army, which took part in recent maneuvers held in Tokio, Japan. The machines in the front row look very much like French Spads with Salmson engines.

REMEMBER — NATIONAL AIR RACES, SEPT. 4-11.

An Application of Modern Aerodynamic Theory

The Adaptation of Certain Phases of Airfoil Theory to Practical Design in the Prediction of Power Consumption and Performance.

A VERY CONSIDERABLE amount of mathematical and experimental work has, in the past, been carried out on the aerodynamic theory of airfoils and other allied subjects and much has been published as a result of these researches, although all of the work, almost without exception, has been of a character far over the heads of many aeronautical engineers and airplane designers for the simple reason that the mathematics involved have been of a highly specialized and complicated nature. The results of all this work are, however, of very vital importance to the practical engineer for upon the very latest conceptions of aerodynamic theory must rest, to a large extent, the degree of aerodynamic efficiency possible in the most modern application of design.

Theory, in the main, has resolved itself into a thorough investigation of the drag of airfoils, etc., and the resolution of much of the theoretical work which has been done into a form in which its application to airplane design is practical has been a problem upon which the Air Service Engineering Division at McCook Field has given considerable attention, culminating in the recent publication of an "Air Service Information Circular" Vol. VI, No. 560, entitled, "Notes on Airplane Performance from the Standpoint of the Modern Conception of Drag".

Modern Theory and Airplane Design

A practical, yet simple, explanation of the modern conception of aerodynamic drag is of great importance and until this is fully understood, it will not be possible adequately to adapt modern theory in this connection to airplane design problems, such as the estimation of power consumption and power required under certain conditions in airplanes.

The drag of an airplane is made up of two different parts:

a. The parasite drag results from friction of the air on the parts of the airplane, including the wings, tail, fuselage, landing gear, etc., and from the eddies set up by these parts when in motion. It is assumed for the sake of simplicity that it follows the familiar law.

$$\text{Parasite drag} = 0.00327\ A_e\ V^2$$

where A_e is the area of a flat plate normal to the airflow having the same drag as the parts considered, and V is the relative speed.

b. The induced drag, as its name implies, is induced by the airplanes' own downwash. This drag follows a different law of variation from the first, namely:

$$\text{Induced drag} = 125\,\frac{L^2}{S^2\ V^2}$$

where L is the lift and S the span of a monoplane wing. In both cases the units are pounds, feet, and miles per hour.

Parasite Drag

The notion of parasite drag, equivalent flat plate and their applications are quite familiar, but heretofore the equivalent flat plate has never been made to include the friction drag of the airfoils.

The modern viewpoint requires that this friction drag be considered as a separate part of the wing drag, since it varies according to a different law than the rest of the wing drag.

For each good airfoil the friction drag has a nearly constant value within the speed range, increasing gradually as the burble points are reached. An airfoil must be considered as having two burble points, one at the angle of attack of maximum positive lift, the other at the angle of maximum negative lift. Ordinarily the latter occurs when this negative lift has a considerable magnitude, but for some deeply cambered sections it may occur near the value of zero lift, or at some low values of positive lift.

Thus when the deductions and estimates are based on the assumption that the airfoils' friction drag is nearly constant, care must be taken that the airfoil is really operating well between the burble points.

The value of airfoil friction drag is determined by subtracting the induced drag from the total drag.

The ratio of maximum lift to friction drag is a good measure of the excellence of an airfoil. This quantity does not assume any value for induced drag which is usually varied at will through changes in aspect ratio.

Tables 1 and 2 show the parasite drag of typical airfoils and airplanes.

Fig. 1 shows the power required to overcome any amount of parasite resistance at all speeds.

TABLE 1.—*Parasite coefficients of various airfoils*
(From Massachusetts Institute of Technology test; 40 miles per hour 36 by 6 airfoils)

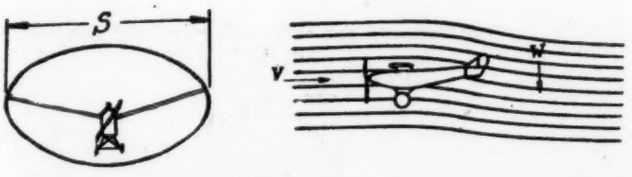
Airfoil	*Minimum friction drag*	K_y *maximum*	K_y Maximum / *Minimum friction drag*
U. S. A. 45	0.0000276	0.00334	120.0
Clark Y	.0000269	.00318	118.2
U. S. A. 35	.0000334	.00383	114.5
R. A. F. 15	.000025	.0026	104.0
Gott. 430	.000033	.00338	102.5
U. S. A. 27	.0000345	.00346	99.8
Gott. 436	.0000313	.00310	98.0
Gott. 387	.000041	.00366	89.3

TABLE 2.—*Parasite areas of various airplanes*

Airplane	*Weight*	(A_e) *Total*	(A_e) *Wing*	(A_e) *Structure*
XBI-A	3,590	13.5	3.1	10.4
JL-6	3,605	13.5	4.5	9.0
VE-9	2,269	8.4	2.1	6.3
CO-5	4,193	12.8	4.7	8.1
CO-4	4,493	14.5	4.5	10.0
MB-3	10,363	58.8	10.6	48.2
PW-8	2,784	8.1	2.0	6.1
Messenger	862	5.5	1.8	3.7
DeH-4	4,297	17.55	3.35	14.20
SE-5A	2,060	9.33	1.88	7.45

Induced Drag

The value of induced drag is determined in the following manner:



As an airplane flies it disturbs a cylinder of air, Figure 1, and imparts a certain downward motion to it. The mass of air affected per unit of time is

$$m = K_p S^2 V \qquad (1)$$

where K is a coefficient determined experimentally or theoretically.

P is the air density = 0.00237

S is the span in feet.

V is the speed of the airplane in feet per seconds.

A downward velocity w is imparted to this air, and the airplane must climb at that rate in order to maintain its path; to do this, work is expended at the rate L w, L being the lift. This work is performed by a thrust which is equal to the induced drag D_{ind}.

so that $Lw = VD_{ind}$

and $$D_{ind} = \frac{Lw}{V} \qquad (2)$$

REMEMBER — NATIONAL AIR RACES, SEPT. 4-11.

Now the lift produced by imparting the downward motion to the air is

$$L = m\,w = K_p S^2 V w$$

$$w = \frac{L}{K_p V S^2} \qquad (3)$$

substituting (3) in (2)

$$D_i = \frac{L^2}{K_p V^2 S^2} \qquad (4)$$

K has been evaluated as follows:

1.57 for monoplane.

1.89 for a biplane with gap; span ratio 1:10.

2.84 for a biplane with gap; span ratio 1:6.

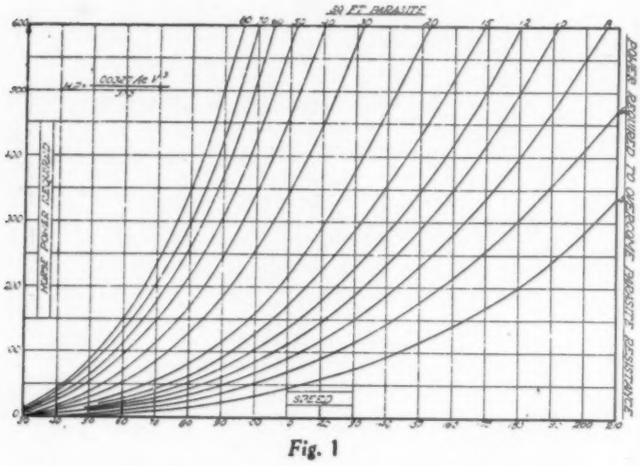


Fig. 1

This means that biplanes, for the same actual span and area, make use of greater quantities of air than monoplanes and more as the gap is increased.

This leads to the notion of equivalent monoplane span which is necessary for comparing biplanes of various gap to span ratios. The use of the equivalent monoplane span makes it possible to use, as a constant value for K, the monoplane value 1.57.

The numerical constants in formula (4) are usually combined so that V can be expressed in miles per hour and the usual form of the formula is:

$$D_{ind} = \frac{L^2}{1.57 \times 0.00237 \times 1.467^2\, V^2 S^2}$$

$$= 125\,\frac{L^2}{S^2 V^2} \qquad (5)$$

The horsepower required for overcoming induced drag is:

$$HP_{ind} = \frac{125}{375}\,\frac{L^2 V}{S^2 V^2}$$

$$= \left(\frac{\frac{L}{S}}{\frac{S}{3V}}\right)^2 \frac{1}{3V} \qquad (6)$$

The factor $\frac{L}{S}$ is called span loading. It is the only factor depending on the dimensions of the airplane which affects the induced drag or induced power.

S is always the span of the equivalent monoplane.

If two airplanes have the same equivalent monoplane span loading, their induced drag will be the same at each speed regardless of their size.

This fact assists materially the conception of induced drag as a tip effect. For a given span loading a definite pressure difference is established between the air above and below the wing, and a corresponding definite tip spillage occurs.

Fig. 2 gives the power required to overcome induced drag for common values of equivalent monoplane span loading at all speeds.

Induced drag is the portion of the drag which can never be eliminated by streamlining the airplane and changing its wing section; it is a direct consequence of obtaining lift with an airfoil of finite span.

Induced drag is not affected by variations in the Reynolds number, and therefore is not subject to any experimental errors.

This chart assumes that each biplane has the necessary decalage or ratio of areas, or difference in upper and lower wing sections, to give the wings such a lift distribution as to produce the least induced drag.

Equivalent Monoplane Span

The general determination of the equivalent monoplane span of multiplanes is a difficult problem, and to date there is no precise general mathematical solution for this problem.

In order to have the maximum equivalent monoplane span with a given span and gap, a multiplane must have the best possible lift to drag ratio, which condition requires adjustment of the lift distribution between the airfoils. This can be accomplished by the use of a certain amount of decalage or difference in upper and lower wing sections, which will vary with the ratio of spans, the ratio of chords, and the stagger. There is yet no simple method of solving mathematically for the best combination of values of these quantities.

If a wind tunnel is available, the most desirable value of decalage can be found experimentally, and whether the best decalage is used or not the equivalent monoplane span of the cellule can be determined by drawing the parabola $K_{xind} = \frac{125\,K_y^2}{R}$, which most nearly follows the polar characteristic curve and solving for span the formula, $S = RA$.

Fig. 3 was constructed by Ivan H. Driggs from data in National Advisory Committee for Aeronautics Technical Note 182 and used in estimating the performance of some 32 airplanes which have been performance tested at McCook Field. The agreement of the estimates with the performances is remarkably close in all cases and warrants the application of this chart and this method as a whole, even to airplanes in which the best combinations of sections and decalage have probably not been sought.

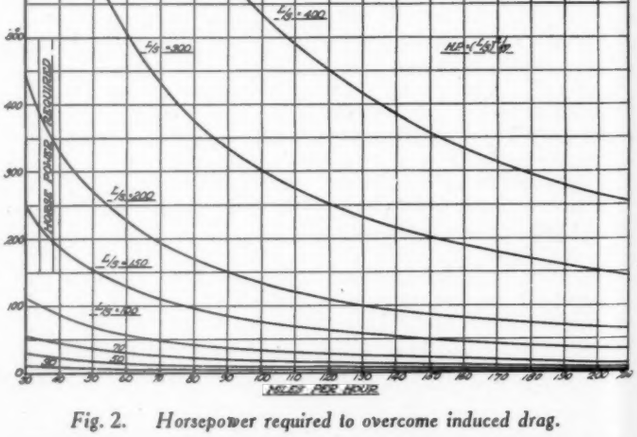


Fig. 2. Horsepower required to overcome induced drag.

The full lines give equivalent monoplane span in terms of the largest span of the biplane for a wide range of span ratios and gap span ratios.

The induced drag of the biplanes, however, will be exactly equal to those of the equivalent monoplanes found on this chart, only if the lift distribution between their upper and lower wings has the particular value which corresponds to minimum induced drag.

The dotted curves referring to the right-hand scale show just what this lift distribution should be, so that the designer should attempt, within the limits permitted by considerations of vision, etc., to secure this distribution. This will be done by adjusting the chord, the section, or the decalage, or any combination of these three quantities.

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Stagger varies the induced drag and lift of the upper and lower wings but does not affect the total amounts of these quantities for the cellule.

The effect of incorrect distribution is to change the induced drag, true parabola to a more complex curve, tangent to it at some point and diverging to show greater values of drag at all other values of lift. This departure is so slight that it can be neglected in most cases.

Example

The charts given above can be used with very little labor to obtain a power required curve for an airplane. An example follows to illustrate the simplicity of the process:

Data given:

Weight	6,000 lb.
Wing area	600 ft.
Gap	8 ft.
Span, upper wing	50 ft.
Span, lower wing	45 ft.
Ratio of spans	0.9
Gap span ratio	.16
Wing section	Clark Y

From Table 2 by comparison with other airplanes the

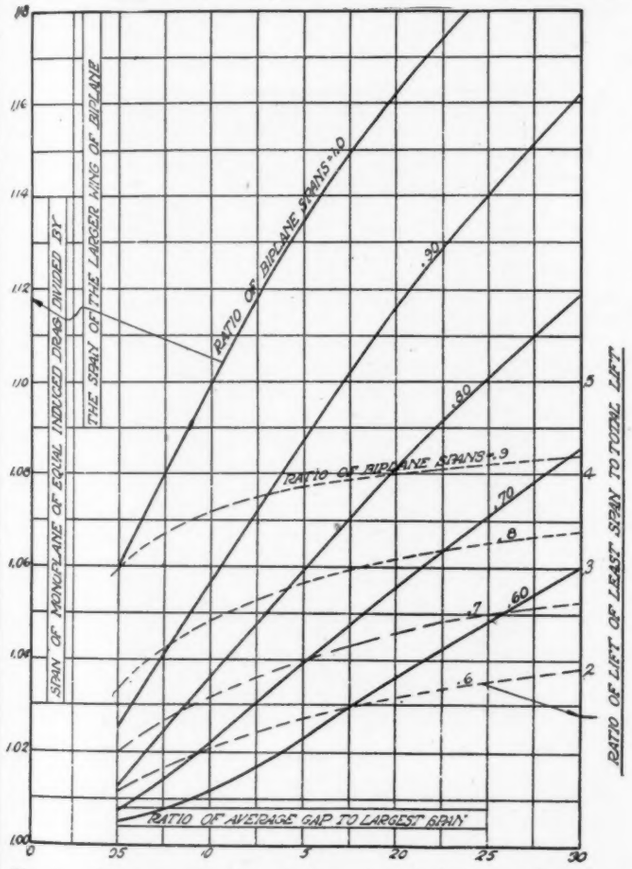

Fig. 3. Chart for the determination of equivalent monoplane span. From N.A.C.A. Technical Note No. 182.

equivalent flat plate of all parts, less wings, is assumed at 10 square feet.

From Table 1 the friction drag coefficient is 0.0000269.

And $K_{Y\max} = 0.00318$.

From chart No. 2 equivalent monoplane span $1.093 \times 50 = 54.7$ feet.

Span loading 6,000 per 54.7=110 pounds per foot.

Equivalent flat plate area of wing

$$\frac{0.0000269}{0.00327} \times 600 = 5.05 \text{ square feet.}$$

Total equivalent flat plate $5.05 + 10 = 15.05$ square feet.

Low speed $V_s = \dfrac{6{,}000}{600}\sqrt{\dfrac{1}{0.00318}} = 56.2$ miles per hour.

With this data we may trace from Fig. 1 and Fig. 3 the curves of power required to overcome induced drag and parasite drag. Adding the ordinates of these curves we obtain the curve of total power required, corresponding to the formula

$$HP_t = \left(\frac{L}{S}\right)^2 \frac{1}{3V} + \frac{0.00327\, A_s V^3}{375}. \quad \text{(See Fig. 4.)}$$

Discussion

The method used in the above example is valuable, because it enables the designer to visualize the relative importance

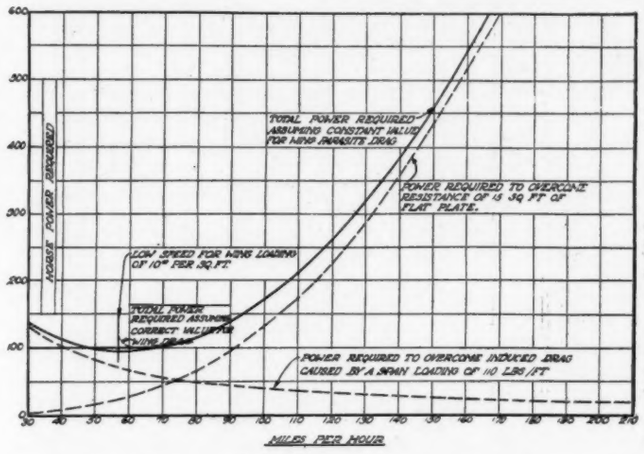
HORSE POWER REQUIRED
TOTAL POWER REQUIRED ASSUMING CONSTANT VALUE FOR WING PARASITE DRAG
POWER REQUIRED TO OVERCOME RESISTANCE OF 15 SQ FT OF FLAT PLATE.
LOW SPEED FOR WING LOADING OF 10# PER SQ FT.
TOTAL POWER REQUIRED ASSUMING CORRECT VALUE FOR WING DRAG
POWER REQUIRED TO OVERCOME INDUCED DRAG CAUSED BY A SPAN LOADING OF 110 LBS/FT.
MILES PER HOUR

Fig. 4. Typical power required curves.

of induced drag and parasite drag, and he can judge clearly the effect of span variation on the performance of the airplane. It eliminates the tabulations of speed, lift coefficient, drag, and power, and also the use of cumbersome methods of correction to L/D through which the effect of aspect ratio is introduced into the results.

This method is subject to all the errors of the common method, and contains one more peculiar to itself, namely, that which occurs because of the assumption that the wing friction drag is constant within the region between the burble points of the section.

The magnitude of this error can be judged by the departure of the assumed polar curve from the actual experimental curve. This is illustrated for a typical wing section in Fig. 5. The error is probably no greater than that resulting from the assumption that the parasite resistance varies only as the square of the speed, nor is it so great as the usual discrepancies between model tests and full-scale tests called scale effects; it could be reduced by using an average value of friction drag instead of the minimum value, but the error would be considerably increased at high speed and only slightly decreased at low speed.

This error can be segregated by using a separate term for the value of wing parasite drag in computing the power required, in which case Figs. 1 and 3 can still be used to advantage in determining the value of two terms of the power equation.

If the wing friction is disassociated from the drag of the airplane, the power, drag, and drag coefficient equations are written as follows:

Total power=induced power+parasite power+wing friction power.

$$\text{Total power} \qquad HP_t = \frac{L^2}{S^2 3_s} + \frac{0.00327}{375} A_s V^3 + \frac{K_{xf} A_w V^3}{375},$$

$$\text{Total drag} \qquad D = \frac{125\, L^2}{S^2\, V^2} + 0.00327\, A_s V^2 + K_{xf} A_w V^2,$$

$$\text{Total drag coefficient} \qquad K_{xt} = \frac{125\, K_y^2}{R} + 0.00327 \frac{A_s}{A_w} + K_{xf},$$

$$K_{xt} = K_{xi} + K_{xs} + K_{xf}.$$

A number of interesting theorems follow from the simple formulæ derived above. They are given in the appendix

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so as not to confuse the reader who is interested only in the elementary fundamentals of this theory.

The new point of view on airplane drag and performance analysis set forth in the note is replacing the old rather slowly because the new theory does not point the way to changes in the physical aspect of airplanes, nor does it bring greater accuracy to the prediction of performance, nor does it point

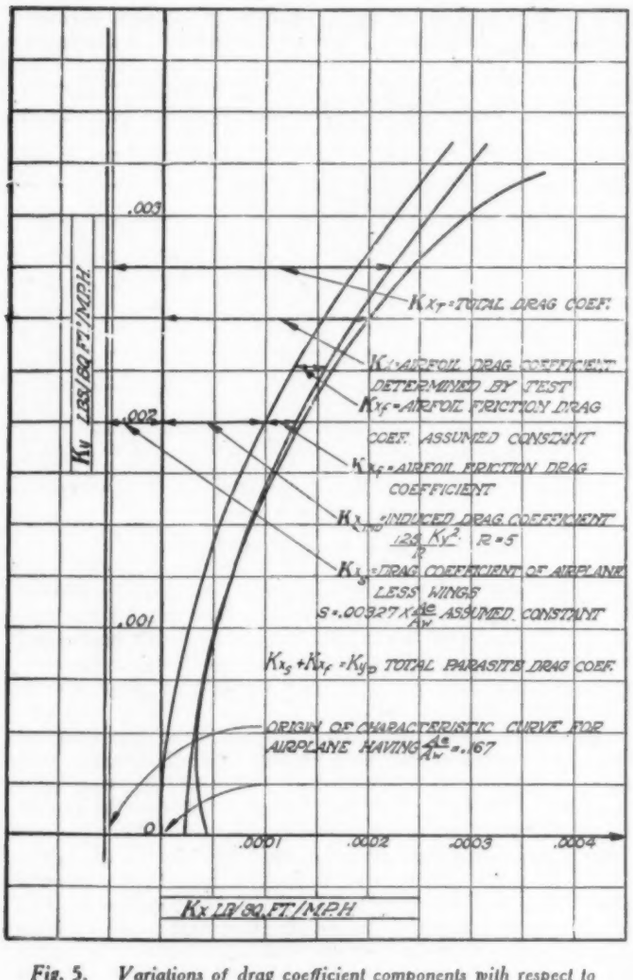
.003
.002
.001
0
.0001
.0002
.0003
.0004
Kx LB/SQ.FT/M.P.H
Kx LBS/SQ FT/M.P.H
KXf = TOTAL DRAG COEF.
KY = AIRFOIL DRAG COEFFICIENT DETERMINED BY TEST
KXf = AIRFOIL FRICTION DRAG COEF. ASSUMED CONSTANT
KXf = AIRFOIL FRICTION DRAG COEFFICIENT
KX2 = INDUCED DRAG COEFFICIENT
KXs = DRAG COEFFICIENT OF AIRPLANE LESS WINGS
S = .00327 KX AS/AW ASSUMED CONSTANT
KXs + KXf = KYp TOTAL PARASITE DRAG COEF.
ORIGIN OF CHARACTERISTIC CURVE FOR AIRPLANE HAVING AS/AW = .167

Fig. 5. Variations of drag coefficient components with respect to lift coefficient.

across the span of the U.S.A. 27 C modified are inferior to those of the other two wings. In the latter, the distribution is almost exactly elliptical throughout the usual range of flying angles. The form of tip incorporated in these models is not completely satisfactory and a modification is recommended. This report may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

to changes which would improve a design if the latter had already been thoroughly studied by the old methods.

This new point of view, if it is to simplify computations, requires that such conceptions as aspect ratio, gap chord ratio, $\frac{L}{D}$, $\frac{D}{L}$, be used less frequently; while other new quantities, such as equivalent monoplane span, span loading, gap to span ratio, wing friction drag, etc., must be visualized and used currently.

Pressures Over Thick Tapered Airfoils

At the request of the United States Army Air Service, the tests recorded in N.A.C.A. report. No. 239, by Elliott G. Reid, were conducted in the 5 ft. atmospheric wind tunnel of the Langley Memorial Aeronautical Laboratory. The object was the measurement of pressures over three representative thick, tapered airfoils, which are being used on existing or forthcoming Army airplanes. The results are presented in the form of pressure maps, cross-span load and normal force coefficient curves and load contours.

The pressure distribution along the chord was found very similar to that for thin wings, but with a tendency toward greater negative pressures. The characteristics of the loading

Belden's Aviation Research Engineer

Edward A. Sipp has been appointed Aviation Research Engineer in charge of the development of special cables for airplane and similar work, which are manufactured by the Belden Manufacturing Company, 2300 South Western Ave., Chicago. The increased demand for special wiring harnesses or cables for airplane applications has made it necessary for the Belden Manufacturing Company to organize a separate department for designing and manufacturing such products.

During the World War, Mr. Sipp was commissioned as a Lieutenant in the U.S. Air Service, and, in that capacity, was assistant Chief Electrical Engineer in charge of the development and production of all electrical equipment for aircraft, such as generators, starters, electrical controls, wire and cable, switches, illumination, heating appliances, etc.

Edward A. Sipp

After the Armistice, he was transferred to the Army Air Service Engineering Division, at McCook Field, Dayton, Ohio, where he was discharged from the service and appointed project electrical engineer in charge of development of electrical gun synchronizers; airplane, airdrome and airways illumination; electrical wire and cable; electrically heated aviators clothing, switches and miscellaneous electrical equipment.

At the present time, Mr. Sipp holds several patents (individual and joint) on various electrical apparatus for airplanes, and was responsible for the standard methods of airdrome and airplane lighting systems now used by the Air Service and adopted later in part by the U.S. Air Mail Service.

R.38 Memorial Prize

The R.38 Memorial Prize, offered annually for the best paper received by the Royal Aeronautical Society on some subject of a technical nature in the science of aeronautics, has been awarded this year to Maj. R. V. Southwell, F.R.S., A.F.R.Ae.S., for his paper entitled, "On the Calculation of Stresses in the Hulls of Rigid Airships". The paper will shortly be published in the Journal of the Royal Aeronautical Society.

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The Kansas City Trade Air Tour

BY J. S. TURNER

Nine airplanes, bearing fourteeen members of the Kansas City, Kansas Chamber of Commerce, took off from the Sweeney Airport, in Kansas City, Kan., at 9 a. m. Tuesday, June 15. On Thursday, June 17, these nine planes were back in the home port, the last one landing less than an hour behind the first, and within an hour of scheduled time. These are the fundamental facts of the first Chamber of Commerce trade tour by airways.

In the three days of travel, the air trippers covered a route of 618 miles by air line, making ten stops. The same route, by motor car, would have been a distance of 857 miles, and, with the same stops being made, would have required five days of hard travel.

The nine airplanes on the tour were of the following types: One U. S. Army DH, three U. S. Army Jennies, two Swallows, two Wacos, and one cabin plane built by the Bennett Air Transport Company of Kansas City, Kan., with a Liberty Six engine.

The pilots on the tour were Lieut. Isaiah Davies, commandant of Richards Field, Kansas City, Mo.; Lieut. W. S. Green; Lieut. R B. Stevenson; and Lieut. W. E. Long, Air Service reserve officers; Fred Kane, flying the Bennett plane; I. J. Spencer and Ben Gregory, flying Swallows, from the Sweeney school of aviation; and Jack Lowderman and Tex LaGrone, flying privately owned Wacos.

The passengers were Lieut. George Grogan, chief Mechanic at Richards Field; Lieut. J. S. Turner; Wyeth C. Walters; D. A. Williams; C. J. Kellem, manager of the Kansas City, Kansas Chamber of Commerce; L. G. Barcus, Kansas City contractor; J. M. Rhiner; F. O. Rorick, advertising manager of the Sweeney Aviation school; R. N. Smith, of the Fitz-Smith Dry Goods Company; Harvey DeGoler, Kansas City druggist; George Darby, purchasing agent for the City of Kansas City, Kan.; J. H. Higley, motor car dealer of Kansas City; Henry Darby of the Structural Steel Company; Edwin Prouty, real estate dealer; and Justin Bowersock, newspaper reporter.

All of these passengers, and four of the pilots, are members of the Kansas City, Kan., Chamber of Commerce, and five of the party—Kellem, Turner, Green, Stevenson and George Darby,—comprise the Airways Committee of the chamber.

The Start

On the first day of travel, the trippers made stops at Ottawa and Iola, Kan., and a final stop at Independence, Kan., for the night. There were only two forced landings on this leg of the journey, the Swallow flown by Ben Gregory going down with a gasoline stoppage shortly after the start and the JN4 Army plane pilcted by Lieutenant Long going down to replace a spark plug which blew out. Since the route of the first day's travel was over level country, landing fields were plentiful, and both of these landings were made without the least difficulty.

On the second day of the tour the air-trippers experienced some of the worst flying conditions imaginable, bucking a 40 mile head wind across three counties, from Independence to Arkansas City, an air line distance of 84 miles. There were six forced landings on this day's program, but two of these were for lack of gas, the heavily loaded planes being unable to make this long hop against such a wind without refueling.

Three of the landings were made by one machine, a JN4 Army plane, which suffered gasoline starvation and was down three times on or near the Independence Field, before the fuel line was finally cleared out. The sixth forced landing of this difficult day was made by a Bennett Air Transport cabin machine, a defective oil pump making the landing necessary.

The second hop of the second day's travel was from Arkansas City to Eldorado, Kan., an air line distance of 58 miles. This jump was made with the strong wind on the tails of the machines, and took just 29 min. for the slowest plane. From Eldorado the trippers hopped to Wichita for their second night's stop.

The third and final day of travel was made with but one forced landing, although it was the longest schedule of the three. The airplanes left Wichita at 8 o'clock in the morning, jumping 93 miles to Saline, thence East to Manhattan, Topeka, and home to Kansas City, Kan. One plane, the Waco flown by Jack Lowderman, was forced down, out of fuel, six miles West of Topeka.

These things the Airways Committee of the Kansas City, Kan., chamber believes were accomplished: First, Kansas City was established as an air center, with the Sweeny Airport, in the Fairfax district, advertised as the best landing field in the Middle West. Second, the safety of air travel for an ordinary purpose was strengthened. It is obvious, from the record of the trip, that nine automobiles, with the same number of passengers, could not have covered the route of the tour in the same time, and would have suffered as many minor accidents in the way of flat tires, dead plugs and the like. Third, the interest in aviation was quickened throughout the State. Fourth, landing fields chosen by the pathfinder plane which covered the route a week before the tour were made permanent by the local chamber of commerce, or other citizens interested in aviation.

The twenty-five air-trippers, on the morning of their start from the Sweeney Airport, Kansas City, Kansas

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The Curtiss Falcon Observation Plane

An Observation Plane With the Performance of a Pursuit Machine.

THE CURTISS Aeroplane and Motor Company, Inc., has just completed the delivery of ten O-1 Falcon airplanes to the Army Air Service, and these machines are now undergoing service tests at various Army fields.

The Falcon is a high-performance two-seater observation airplane, designed to fulfill the requirements of the Army Air Service for a modern observation machine to replace the obsolete De Havilland's which, until recently, have been standard equipment of Air Service squadrons. It will be remembered that in 1924 the Air Service instituted a competition for this type of machine, and the Falcon was one of three machines submitted. In this competition the Falcon was awarded more points than either of its competitors, was the only machine to exceed the point requirements, and was awarded the first prize. Based on the results of this competition, a contract for 10 Falcons was awarded to the Curtiss Company. The Curtiss D-12 engine had, by this time, so firmly established itself as the premier engine of its class that the new contract called for the substitution of the D-12 for the Liberty and other engines with which the original Falcon was interchangeably equipped. Thus the Falcon became a true Curtiss product, designed, manufactured, and assembled, in its entirety, by the Curtiss organization.

The Result of Extensive Research

The aerodynamic features of the Falcon represent the very latest refinements in aeronautical engineering. The entire design was predicated upon the realization of the fact that high performance and extreme maneuverability must be obtained, above all else. To this end, the overall dimensions were kept extremely low, in spite of the great weight and bulk of the useful load to be carried, and particular attention was paid in the layout to cleanness of line and to controllability. The excellent facilities for aerodynamic research and test, provided by the Curtiss aerodynamic laboratory, were utilized to the fullest extent. An extensive series of model tests were conducted in the wind tunnel, to determine the arrangement which showed the best combination of high performance and maneuverability, together with greatest possible visability in all directions, without sacrificing any of the other requirements of the design. The final design was of a single-bay tractor biplane of small overall dimensions, having a pronounced stagger combined with sweepback in the upper wing. The value of the engineering research carried out in the preliminary stages of the design can be appreciated when one realizes that the Falcon out-performs and out-maneuvers any observation machine in service today, while still meeting in a highly successful manner all of the requirements for an observation machine.

Structurally, likewise, the Falcon is the embodiment of advanced engineering, and all parts have been designed to afford a maximum of strength and rigidity with a minimum of weight and bulk. U.S. Army strength requirements, which, for a design of this type, are high, have been met or exceeded throughout.

Wing Structure

The biplane wing cellule is composed of five panels; two lowers, two upper outers, and one upper center section. The wing beams are a combination box and I section, with spruce flanges and thin spruce planking webs. This type of construction provides extreme rigidity and strength with low weight. The ribs are of the Warren truss type, with thin birch plywood webs. Considerable ingenuity is evidenced in the design of the wing fittings, of duralumin and steel, which are light, simple and strong. Drag bracing consists of duralumin struts, and streamline wires. The rigidity and true contour of the leading edge of the wing is preserved by a sheathing of thin duralumin extending back to the front beam. The covering is the usual fabric. The interplane struts are of streamline steel tubing with simple adjustable ends, and the interplane wires are streamline.

The pronounced forward stagger, combined with sweepback of the upper wings, provides an excellent field of vision for both pilot and observer.

Riveted Duralumin Tube Fuselage

The fuselage is constructed entirely of duralumin tubing using a patented riveted joint connection for the members, which form a rigid Warren truss. In order to facilitate construction and to preclude any possibility of fatigue due to vibration, the major fuselage fittings, including wing hinges, landing gear attachments, etc., are of high tensile steel. Although a considerable amount of engineering research and experimenting was necessary in order to perfect the duralumin fuselage, the saving of approximately 25% in weight more than justified the extra effort.

A three-quarter front view of the Curtiss O-1 Falcon observation plane (Curtiss D-12, 420 hp.)

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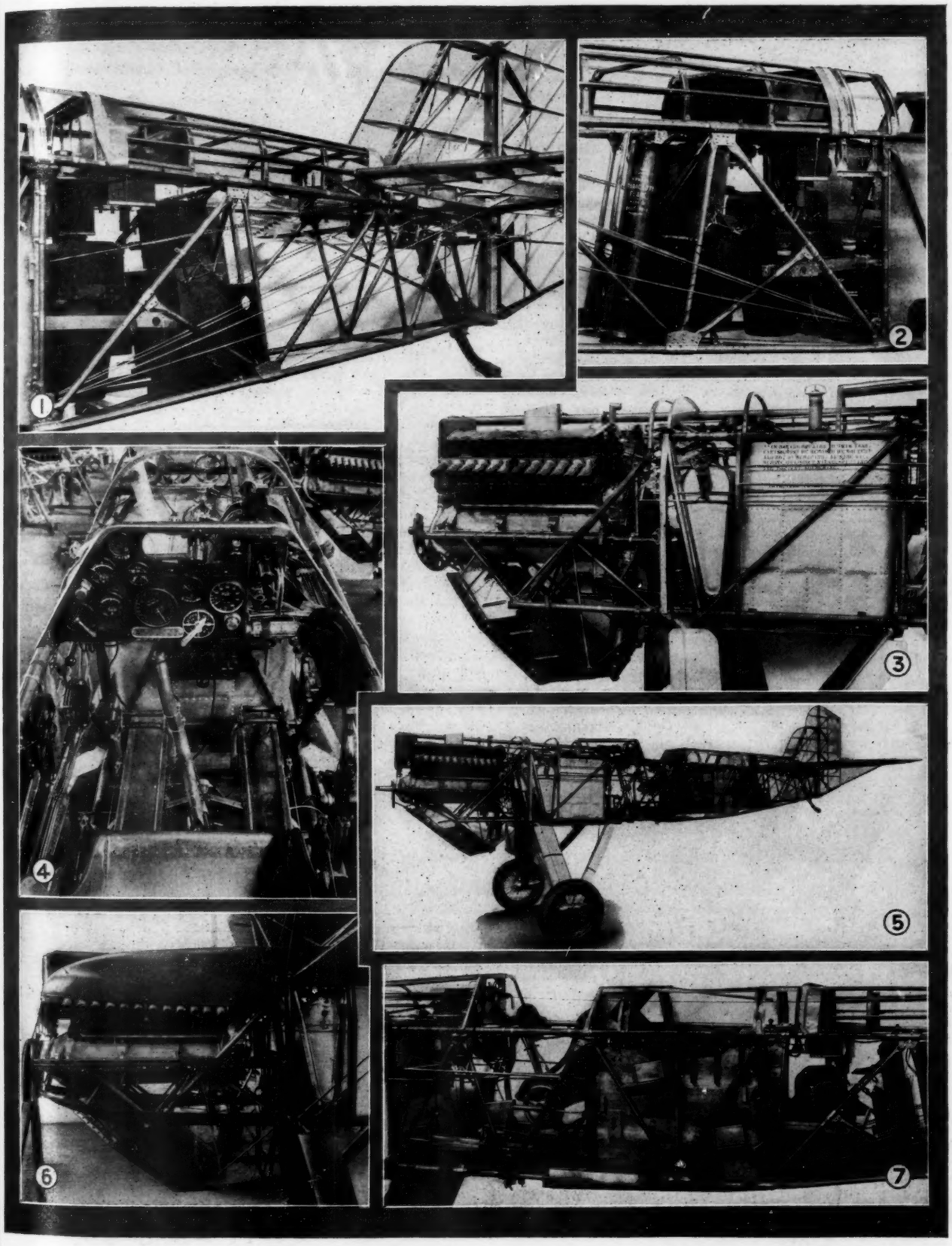

Details of the Curtiss O-1 Falcon. 1, *The Camera and radio installation just aft to the observer's cockpit.* 2, *The reverse view of the radio and camera installations, showing also the parachute flare.* 3, *Showing the welded steel tube engine mounting, the oil temperature regulator extending upwards from the lower end of the radiator, the multi-rubber disc shock-absorber just aft of the firewall and the nickel-plated duralumin fuel tanks.* 4, *Giving an excellent idea of the ingenuity applied to installing all the required equipment in the pilot's cockpit, so that it is readily available.* 5, *A skeleton view of the Falcon fuselage.* 6, *Showing how carefully the cowling has been designed to reduce head resistance to the greatest possible extent.* 7, *A general view of the pilot's and observer's cockpits. A close examination of all these photographs cannot but impress one with the problems to be met in military airplane design and the ingenuity and skill necessary to meet these requirements.*

The engine mount is a detachable welded steel unit, of the type which has proved so satisfactory on the Curtiss Hawk pursuit machine. The quick detachable feature makes possible the installation of Curtiss D-12 and Liberty 12 engines, interchangeably.

Undercarriage

The landing gear is of the well-known Curtiss split-axle type, using rubber compression discs, housed within the fuselage, as the shock-absorbing medium. The type of landing gear, which has been successfully used for several years in the Hawk, is ideal for taking off or landing on rough or muddy ground, grain fields, etc., possesses a very high degree of shock absorbing ability, and is far superior to the rubber cord type from the maintenance standpoint. The tail skid is slung in such a manner as to prevent the sudden application of heavy loads to the fuselage in a hard landing, and is steerable, a feature which permits a high degree of ground maneuverability, when taxiing.

The tail surfaces are constructed entirely of duralumin, with fabric covering.

Nickel-Plated Duralumin Tank

As has been mentioned before, the power plant consists of either the Curtiss D-12 or the Liberty 12 engine. Features of the power plant which are of particular interest are the underslung or tunnel type of radiator, which is of advantage both from an aerodynamic and a vulnerability standpoint; the oil temperature regulator, a feature which not only facilitates quick starting in cold weather, by rapidly warming the oil, but also prevents the oil from overheating in flight; and the Curtiss-Reed duralumin propeller. The fuel tank, which can be instantaneously dropped by the pilot in case of fire or an impending crash, is of nickel-plated duralumin, a patented Curtiss feature, which provides the serviceability and excellent maintenance features of a brass tank at a great saving in weight. Fuel for 3 hr. flight at full throttle is carried, and, in addition, an auxiliary tank can almost instantly be attached under the fuselage, increasing the endurance to 4½ hr. or 675 miles. This tank, like the main tank, is of nickel-plated duralumin and is droppable. The total gasoline capacity is 169 gal.

The ingenuity and experience of Curtiss engineers is perhaps best evidenced in the pilot's and observer's cockpits, where are located not only the controls and instruments necessary for operating the plane, but also over 600 lb. of useful load and equipment in the form of armament, camera, radio, bomb sights, and the other necessary paraphernalia of an observation plane, and, in spite of the small size and clean lines of the fuselage, all of this equipment is conveniently located and easily operated by the crew.

The performance of the Falcon with its full military load of almost a ton (1,750 lb.) exceeds by a wide margin that of any other observation plane in service today.

Performance Details

With the D-12 engine installed, its approximate performance gives a high speed of 150 m.p.h., initial rate of climb 1,200 ft. per minute, with a service ceiling of over 18,000 ft. With the Liberty engine, although the high speed drops slightly, it still has about 10 miles excess in speed over any other observation type. Furthermore, it possesses a degree of maneuverability never before obtained in a plane if this class, comparing favorably in this respect with the Curtiss single-seater pursuit planes. These features, combined with its great range of vision, durability and easy maintenance characteristics, make it an outstanding type in the list of Curtiss contributions to military aircraft.

Possibilities as a Fighter

The desirability of restricting the number of different types of planes in military service is becoming evident in the Army Air Service as well as in Naval aeronautics. The Curtiss Falcon meets this trend of development in a peculiarly fortunate manner. Interchangeability of power plants from the Liberty-engined observation to the D-12 plane with maximum performance, is obtained without any change in the machine aft of the firewall, the engine mounting being attached to the fuselage by four bolts. Further, while this plane is built as an observation plane, the Service is making an intensive study of it as a two-place fighter at Selfridge Field, where it has been found to outperform in many instances at high altitudes the standard pursuit machines. It will later be tried out as an attack plane, where its high speed, quick control and ability for quick dives and zooms will be of great advantage.

It is obviously desirable for the Service to acquire a plane the spare parts, maintenance and servicing of which are identical, whether it be adapted for any one of a number of special services.

Another view of the Curtiss Falcon observation plane (Curtiss D-12)

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Activities of the N.A.A.

In the long run, the attitude of the general public toward flying is the controlling factor in the prosperity and hence the continued development of aviation. Bringing aviation activities before the public in a favorable way is a difficult task and must be handled through a variety of different agencies. Among these agencies the National Aeronautic Association is unique because of the national scope of its organization and its international prestige as representing the Federation Aeronautique Internationale. The following letter from Godfrey L. Cabot, the President of the Association, gives a valuable idea of the scope of the Association and the spheres in which it has been active.—EDITOR.

TO THE EDITOR:

I THANK YOU very much for your kindness in affording me an opportunity to say a few words with regard to the activities of the National Aeronautic Association during the last year.

Our function as American representative of the Fédération Aéronautique Internationale is well-known to the public and numerous highly successful air meets have, each in its turn, received that generous recognition in the public press that is usually given to aeronautical affairs. We are none the less grateful for this liberal treatment that we recognize therein chiefly the manifestation of a patriotic desire of the press of this country of every shade of political opinion to contribute, not only to the prosperity, but to the safety of this country, by educating the American public to be air-minded, thus hastening the growth of aeronautical activities throughout the length and breadth of this land.

We may briefly mention the record breaking time made in the Pulitzer Race and in the Schneider Cup Race in the last year and the record for successful air touring made by the Ford Reliability Tour last fall in which sixteen out of seventeen contestants arrived on time after a week of almost continuously rainy weather. This achievement was particularly important as denoting the rapidly increasing ability of heavier-than-aircraft to overcome adverse atmospheric conditions.

America is very proud of the recent winning of the Gordon-Bennett Race in Belgium by the American pilot, VanOrman of Akron. We hope that America will soon win in the lighter-than-air branch the primacy which it has enjoyed for over a year in heavier-than-air performances.

There are, however, other activities of the National Aeronautic Association no less important than their functions as representative of the Fédération Aéronautique Internationale but less spectacular and, therefore, less known to the public.

In the first place, it is our duty and our pleasure to coöperate with all efforts making in this country toward legitimate permanent air activities. Visiting members of this Association and many distinguished men of the different parts of the country who come to this City to get Congressional or Departmental action are welcomed, entertained and assisted in their efforts, and we have received the most grateful and appreciative letters from all parts of the country for our cooperation in such and many other matters. For instance, in assisting to secure an appropriation for the landing field near Little Rock and for a National Guard Unit; in assisting to secure additional ground for the airdrome near Seattle; in urging continuously, strenuously and effectively upon the people of the Greater New York the importance of additional air facilities in the vicinity of this greatest center of population and commerce. We have coöperated with the Navy in securing the rescinding of the action of the sinking fund commissioners of the State of New York which threatened to deprive the Navy of that historic air station from which the N.C. boats started when the N.C.4 made its flight across the Atlantic Ocean in 1919. This year has witnessed the organization of a large and enthusiastic and very active chapter under the Presidency of Mr. Bergen in Newark, New Jersey, and we shall continue to urge upon every citizen the necessity of coöperation in this difficult but all important matter.

In no previous year has this Association had so much cause for pride and gratitude as in this year. For nearly four years it has been striving continuously, persistently and intelligently for Federal legislation to increase the safety of man-flight and furnish facilities thereto, and this effort culminated in the passage last month of the so-called Bingham-Parker Bill, a most carefully drawn and excellent measure, under which the Federal guarantee of the competence of pilots and airworthiness of aircraft will soon give the traveling public assurance of greater safety than was heretofore possible in the air.

Also another Kelly Bill has gone through, which permits the Postmaster General to weigh the air mail instead of counting it, thus saving much time and some expense, both to the Government and to the contractors. The Honorable Clyde Kelly certainly deserves great credit for having pushed through two air bills, short and practical, on which is based the present activity in starting commercial aviation by common carriers in this country.

There are now ten new air routes along which mail is being transported or is shortly to be transported by contractors who are also permitted to carry passengers, express matter, etc., as an outside venture of their own, with the sole proviso that this outside business shall not interfere with their punctual execution of their contract for the carriage of the mail.

The Postmaster General has stated that he thinks it of utmost national importance that these people shall make money and not perish by the wayside, as has been the lot of previous public service corporations that have offered air traveling facilities to the people of this country. The National Aeronautic Association has undertaken to act as an unpaid sales agent to promote the prosperity of these enterprises by sending personal letters to such large prospective customers as the contractors may name to us, urging upon these prospective customers the practical advantages that they may hope to obtain in their particular business through the use of the air mail and of the air express transportation.

We strenuously urge all good citizens to join with us in this effort, realizing that the business success of these enterprising men who have staked their money in an industry that has heretofore only been permanent in Europe with the help of Government subsidies and never been profitable in this country, depends on our cooperation.

It is not simply that these men deserve sympathy and help, but it is chiefly the far more important interest of the country itself, for, by promoting the growth of civil and commercial aeronautics, we shall help to train up a small but ever increasing army of expert fliers whose mere presence in this country promotes our national safety without exciting fear or jealousy of any foreign power.

In conclusion, we shall call public attention to the fact that the officers of this Association serve without pay, proud to contribute by their time and their money to a patriotic, progressive movement, which should receive the support of every one of your readers.

Our various chapters are pleasant centers for informal gatherings at frequent intervals, at which things aeronautical are discussed in an interesting way by many competent speakers; for instance, Postmaster General New spoke at the last meeting of the Washington Chapter and Congressman Kelly will speak at the next meeting.

These gatherings are none the less pleasant because back of the desire for pleasant social intercourse lies the impelling force of public spirit and a serious purpose to lead in a new Art and Industry that is destined shortly to overshadow the earth and greatly benefit our national safety and prosperity.

In conclusion, we urge that the achievements already to the credit of this Association are but an indication of far greater victories to come. There are now in Conference two Bills which we have been urging upon the Congress for a definite program of air development for the Army and the Navy, a principle which our first President, Mr. Howard E. Coffin, has long been advocating, and which we have been strenuously urging in accordance with the vote of our Board of Governors.

We are hopeful that these Bills will pass and will mark the beginning of greater order in our air development and greater resulting progress in proportion to expenditure than has heretofore been possible.

GODFREY L. CABOT,
President, N.A.A.

Underwood & Underwood

The three-engine Fokker F-7 (Wright Whirlwinds) of the Philadelphia Rapid Transit Company, leaving Philadelphia at the inauguration of the Washington-Philadelphia Air Mail Service. Passengers are also carried.

Washington-Philadelphia Air Mail

The Philadelphia Rapid Transit Air Service, of Philadelphia, Pa., with J. A. Queeney, president, was the only bidder on the Washington to Philadelphia route. The concern agreed to carry the mails for $3.00 per lb. per mile, to furnish three three-engine planes, two to be placed in immediate use and one held in reserve.

The Philadelphia Rapid Transit Company received the contract and the service was opened on July 6 with Fokker three-engine F-7 monoplanes equipped with Wright Whirlwind 200 hp. air-cooled radial engines. The first plane left Philadelphia at 12:00 noon and arrived in Washington at 1:30 p.m. The pilot was Alton B. Parker, who accompanied Commander Byrd on the Arctic Expedition as reserve pilot.

Passengers are carried in addition to mail and on the inaugural flight the following made the journey to Washington and back by the plane:

Dr. A. A. Mitten, vice-president and vice-chairman of the Philadelphia Rapid Transit Company; A.H.G. Fokker; Mr. and Mrs. Spencer K. Mulford Jr. and Mr. and Mrs. Walter H. Chapman.

New York-Buenos Aires Flight

Owing to the bad weather which prevailed in the vicinity of Maraca Island, off the coast of Brazil, Bernard Duggan, with his two companions who are flying in a Savoia flying boat from New York to Buenos Aires, found it necessary to delay the continuation of the flight until late on Saturday, July 3. A sudden lull in the weather enabled a take-off to be made from the water with a small load of fuel, which necessitated the flight to Para, Brazil, about 300 miles being made in two jumps. The stop was made at Punta Caridade, on Caviana Island, about 150 miles from Para, and it was necessary to await the arrival of the tug from Maraca which carried the remainder of the gasoline supply. On the way to Punta Caridade an alighting was made at San Sebastan Marajo in order to make a few adjustments to the engine. The fliers started for Para early on the morning of July 5 and the flight, which was uneventful, occupied about two hours.

Helsingfors-Stockholm Air Line

The Helsingfors-Stockholm air line, has substituted for the small passenger planes previously being used, a new Junkers machine accommodating 10 passengers. Departure from Helsingfors is at 3 p.m. and from Stockholm at 10 a.m. daily. The trip requires 2 hr. 40 min.

Passengers bound for London or Paris may take the night train from Stockholm to Malmo, from which point planes leave for the two capitals. Connections are also made with airplane lines to Berlin, Prague, Vienna, Brussels and Dresden. Passenger tickets from Helsingfors to Stockholm are approximately 850 to 900 marks, compared with 1,000 marks in the Summer of 1925. The total cost of the airplane trip to Paris is about 3,900 marks, and to London 4,000 marks, including the train journey across Sweden.

From Reval flights can be made to Riga. The line to Koenigsberg will not be reopened as it has proved unprofitable.

Up to April 1, 1926, a total of 689 passengers, 11,000 kgs. of baggage, 6,500 kgs. of mail, and 2,000 kgs. of freight were carried.

The International Aeronautic Exposition

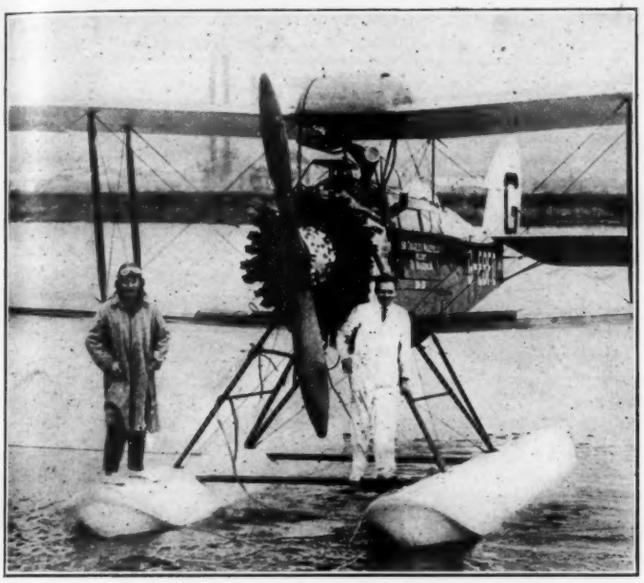
The tenth Exposition Internationale de L'Aeronautique will be held in the Grand Palais des Champs Elysées, Paris, on Dec. 3-19. As in previous years, M. André Granet will be Commissioner General of the Exposition.

International Newsreel Photo

The arrival at New York of the first mail plane of the Colonial Air Transport Company. Left to right: Leroy Thomson, H. I. Wells, Maj. T. O. Freeman, pilots; and J. T. Trippe, general manager of the company.

The London-Australia-London Flight

On June 30, Alan Cobham left Rochester, England, with A. B. Elliott, mechanic, on his flight to Australia. He is flying the identical plane which carried him and Elliott from London to Cape Town and back, recently. The plane, a DeHavilland 50, has of course, been overhauled but it is understood that the plywood of the fuselage and the internal structure of the wings remain untouched, which is an interesting fact when it is remembered that the flight to Cape Town necessitated encountering extremely damp and hot weather.



Alan Cobham and A. B. Elliott just prior to leaving for the The route of the London-Australia flight

The engine, the Siddley Jaguar air-cooled radial of 385 hp., has also been overhauled since the Cape flight and, with a few replacements, is being used again. The D.H. 50 has been equipped with metal floats which will be replaced by a land type undercarriage when Port Darwin, Australia is reached.

The route being followed by the flight is shown in the accompanying map.

A very sad incident overtook the flight when Cobham was passing over Khor-al-Hammar, 100 miles Northwest of Basra, Iraq, on July 5. The plane was shot at from the ground while flying at low altitude and the bullet seriously wounded Elliott who was seated in the cabin of the plane, resulting in his death later in hospital. The bullet, which was, apparently, fired at random from the ground by one of the Arab inhabitants of this district, struck a gasoline pipe and, glancing off, passed through Elliott's arm and into his chest. Cobham, realizing something had happened but unable to determine just what it was, rushed the plane to Basra.

The route of the London-Australia flight

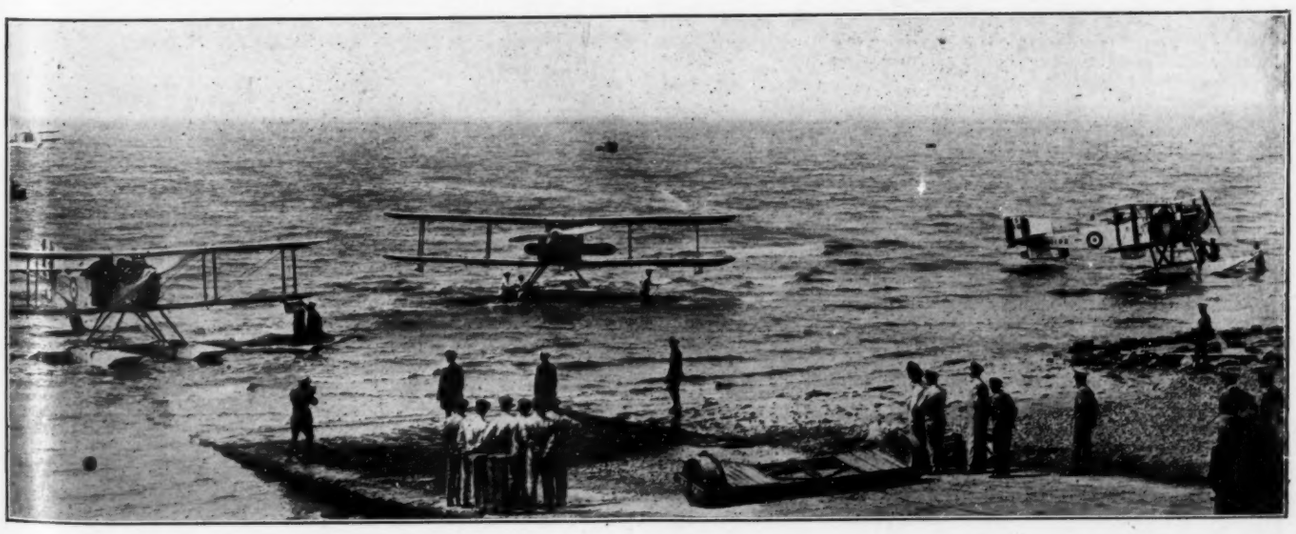
In spite of the extremely unfortunate death of his friend and mechanic, Elliott, who accompanied him on his London-Rangoon and London-Cape Town flights, Alan Cobham will continue his flight to Australia, a distance of 13,000 miles. A mechanic, as yet unnamed, is immediately proceeding to Basra to continue the flight with Cobham.

Cairo-Cape Town-Cairo-England Flight

On June 21, one of the most interesting long distance flights ever undertaken was successfully completed when four Fairey IIID seaplanes arrived at Lee-on-Solent, England, after having flown from Cairo, Egypt, to Cape Town, S. Africa and back to Cairo and then on to England. The flight, which was an official Royal Air Force undertaking, started at Cairo on March 1. A number of stops were made en route and the planes, then equipped as land machines, arrived at Cairo on April 12. No attempt was made at creating a record time. The distance from Cairo to Cape Town is 5290 miles and the flying time was 63 hr. indicating an average speed of 84 m.p.h.

The four planes left for Cairo on April 19 and arrived there on May 27, one day ahead of schedule. The return journey took 67 flying hours and the average speed was 79 m.p.h. The flight was continued to England on June 9, with floats fitted to the machines.

It will be remembered that Alan Cobham recently completed a somewhat similar flight from London to Cape Town and back. The significance of the present flight, however, is in the fact that, in spite of the extreme weather, the heat and the dust of the tropics, all four planes were able to keep together and no mechanical trouble was experienced to delay the flight. The machines were equipped with 450 hp. Napier Lion engines, the reliability of which must be considered to have been well established by the successful conclusion of the flight. The Napier Lion is a twelve-cylinder water-cooled engine, with the cylinders arranged in three-banks of four each.



Photopress

The arrival of the four Napier engined Fairey IIID seaplanes of the Royal Air Force at Lee-on-Solent, on June 21, thus ending the 14,000 mile flight, Cairo-Cape Town-Cairo-England

"Side Slips"

By ROBERT R. OSBORN

It seems that our recent statement that no pretty girls were being used in aeronautical advertising was not entirely correct. Someone has called our attention to the May issue of *"The Alexander Aircrafter"* on the cover of which is displayed a young lady attired in a,— ah,— you know, one of those things they wear, and holding in her hand a butterfly. There is no definite statement accompanying the picture as to whether the young lady is symbolizing "Civic Virtue" "The Dying Gladiator" or "Aviation Awakening", and it might well be pointed out by the non-believers in this type of advertising that there is absolutely no connection between aviation and such daring models. However, we are willing to bet a right lower Jenny aileron against anything at all that more Eagle-rocks were sold by that picture than if it had been replaced by statictics on climb, landing speed, ceiling, etc. We take it as a good sign that the industry is awakening to the advertising value of pretty girls, and until a prior claim is entered through this department, The Alexander Aircraft Company will be credited as the pioneers in real aeronautical advertising.

• • •

We know for a fact, too, that this issue of *The Alexander Aircrafter* has shown the light to the publicity director of at least one large company. His company expects to finish a large bomber in the near future and he is in a quandary whether to have it unveiled at the opening night of one of the Broadway musical comedies or to publish a lot of signed statements from society leaders that no one who is anyone would be seen flying in any type of aircraft but this bomber. If this does not have the desired effect right away he thinks it may be necessary to give away some of the same planes painted in the latest sport colors to a few of the moving picture beauties.

The announcement that a camera is about to be tested at McCook Field which is expected to have a panoramic range of 318 miles convinces us that soon there will be no privacy in this small world at all. Many times we have stood on a street corner in a strange city and thought that if we wanted to commit a robbery, or perhaps a murder, at that particular time, no one would ever have the slightest idea who had been guilty of the deed,—only to have a friend tell us some time later that just at that moment he was passing in a car or a trolley and was attempting to wave to us. Unless "this airplane business" goes completely to the dogs we don't expect to have to take up banditry for a living, but if we should, it would be our luck to have some chap spoil a perfect alibi and get-away by presenting to the police a picture, taken of us, from five miles up, in the very act of robbing the mail truck.

• • •

The news that the Philadelphia Rapid Transit Company which operates subway, surface and elevated lines, motor busses and taxicabs in the City of Brotherly Love, has also opened up air service between Philadelphia and Washington with three Fokker monoplanes, is interesting, indeed. However, the reporters always seem to leave out what might be the most interesting part of the story. No mention is made whether on the first trip, the pilot kept calling out "Plenty of seats in the rear" and "Front way out, Lady". Also, we'd like to know who was the first airplane straphanger, and if it is possible to ride from way out in the suburbs of Philadelphia to Washington all on the one nickel fare.

• • •

Our friend, The Intrepid Aviator, was in to see us again this week and says he is very much interested in these attempts to lower the time required for a complete trip around the world, and hopes to get a chance to talk to the chaps trying it. He says he'd like to compare their collection of hotel soap and Pullman towels with the one he made on a recent trip in the West.

Another Custom Built TRAVEL AIR

DUAL PURPOSE CABIN PLANE FOR EITHER MAIL OR PASSENGERS

As a passenger plane, cabin seats four passengers comfortably. If used for mail or freight it has a capacity of 55 cu. ft. with 180 Hispano engine, and 60 cu. ft. with Wright Whirlwind engine.

PERFORMANCE
With 180 Hispano and 700 lb. pay load

Maximum speed - -	110 m.p.h.
Landing speed - -	40 m.p.h.
Climb to 1000 ft. - -	1 min. 45 sec.

PERFORMANCE
With Wright Whirlwind and 800 lb. pay load

Maximum speed - -	120 m.p.h.
Landing speed - -	40 m.p.h.
Climb to 1000 ft. - -	1 min. 30 sec.

TRAVEL AIR MFG. CO., WICHITA, KANS.

When Writing to Advertisers, Please Mention AVIATION

Consolidated Airplanes Wear Well

Quality is first in their design and manufacture
Up-keep, ordinarily a serious problem is almost nil

Trade Mark *Copyrighted*

Only American manufacturers specializing in training airplanes
Five years continuous development on one basic design
Safest training and sportsmen's airplanes ever flown

Contractors to United States Army and Navy

CONSOLIDATED AIRCRAFT CORPORATION

Buffalo, New York

AIRPORTS AND AIRWAYS

San Diego, Calif.

By Thomas Mathews

Martin (Goof) Jensen, local OX5 dare-devil and one of the few pilots still living who can claim the distinction of having flown an OX-5 Jenny across the continent and back with a passenger, negotiated with Ike Solomon, local junk vender to buy a few Wright J-1 parts. The fifty dollar bill Jensen flashed at Solomon got the latter's Irish up and he sold "Goof" enough parts to build a Wright J-1 complete, which Jensen installed in the front of his trusty Curtiss contraption in place of the OX-5. Everybody said it couldn't possibly fly.

Which reminds us of the time Pat told Mike he couldn't be put in jail for beating up his wife. "Can't hell! I'm here!"

Well, Jensen's J-1 Jenny flew, no question about it. The 200 hp. radial engine made it do things few Jennys ever did and in one afternoon 13 pilots had been allowed to fly the new innovation in American aviation,—a Jenny pursuit. Even more remarkable, perhaps, is the fact that the darn plane seemed to be fairly stable and landed so slowly that the big Martin bomber wheels on it only revolved three times before it came to a stop. Jimmy Russel, the inventor of the famous Russel parachute, guaranteed to open in ⅕ of a second, equipped all the passengers with parachutes. It was a big day.

T. C. Ryan of Ryan Airlines pulled the surprise of the 1926 season recently by appearing on the scene with a new cap. When asked if it was a boy or girl, he blushed and motioned the gang into the office. On his desk where orders for seven Ryan M-1 monoplanes, to be equipped with Hispano-Suiza engines, two for Super-Rhones, two for OX-5 and three more Wright-Whirlwind jobs. These, together with the orders already on hand means that the factory will have to work double shifts and over-time making deliveries.

The people of San Diego are having a touch of the real thing as far as war maneuvers are concerned in the way of smoke screens, gas attacks, formation and pursuit work. Navy planes with big smoke pots hanging beneath the fuselage head into the wind and a few minutes later the town is fogged up worse than Chicago with all the factories going. Overhead the pursuit group, epuipped with Boeing and Curtiss planes, cause a continual Brrrrrraaaaa as they try to get a line on each others tail.

Even the non-flying police force gets excited occasionally and recently pilots were rounded up and had to appear in court for not having a city license to fly. Life is real, life is earnest out here in the city of a thousand planes where every day is a flying day and the only things that keep airplanes on the ground is fog and the new city ordinance.

Guy Cole the Montana cowboy aviator has not quite finished his new plane being constructed out in East San Diego. He is working on it night and day, however. It won't be long now.

Reports that $4,580,000 worth of case whiskey is just outside the 12 mile limit to supply Los Angeles and San Diego during the holiday season, is correct. The number of people taking up yachting has increased considerable. Bids will be received on the construction of 12 OX-5 Jennies equipped with pontoons!

Cincinnati O.

By R. Alvin Hug

Flying activities in Cincinnati have shown a big increase over last year and everything points to the biggest season the city has ever known. The city's three large flying fields are all in full operation and record crowds are visiting these fields every Sunday and holiday.

The municipal airport, known as Lunken Airport, is located on the Little Miami River adjacent to Kellogg Ave. and is by far the best field in the city. Several large hangars have been erected on the field as well as quarters for the Reserve Officers and commercial pilots. The Embry-Riddle Company, distributors of the Waco 9 for Ohio and Kentucky, are located at Lunken Airport and have done much to popularize aviation. On June 13, they staged a flying exhibition which was witnessed by 15,000 persons. Although stunt flying is considered by many fliers to be detrimental to the growth of commercial aviation, it is very popular here and seems to be the best way to draw a large crowd to a flying field. And every operator knows that he must get the people to his field before he can take them up!

The Eaton Flying Field is situated about one mile North of Lunken Airport on the Union Levee (Beachmont Ave.). This field is not quite as large as the municipal airport and has no hangars. It is managed by Eaton, who is publisher of the *Racing Record,* and Dixie Davis, who will be remembered as the pilot who flew Daredevil Lockwood over the city on his visit last Summer. Dixie is a nervy little flier and gave the crowd that attended the motor boat races last September quite a thrill by flying under the bridges spanning the Ohio River. The planes at the Eaton flying field are mostly Jennies and Standards, and are certainly attractive paint jobs. An aerial circus was scheduled to be held at this field on July 6, but due to the strong wind which prevailed throughout the day, these events had to be called off.

The flying field most dear to all Cincinnati pilots is Grisard Field, located at Blue Ash, just outside of Cincinnati. Before the opening of Lunken Airport it was the rendezvous of the Reserve Officers and many commercial pilots. It looks pretty much like the "Deserted Village" now, but Hugh Watson and his friends are trying hard to uphold its reputation as a "lively little place". A parachute drop by Sgt. DeWisse was featured on June 20 and a crowd estimated at 20,000 was on hand to witness the event. Other parachute jumps and flying exhibitions have been staged at Grisard Field and every one has been a big success. On June 21, Watson flew a priest from Fayetteville, Ohio, to the Eucharistic Congress at Chicago, making the entire distance in three hours, which is very fast time.

It is estimated that there are about twenty-two privately owned planes in the city at present and these have carried over 4,000 passengers during the past year. The usual charge of $5.00 a "hop" prevails here and each week scores of Cincinnatians are getting the thrill of their first airplane ride. The air mail route from Cleveland to Louisville will pass through Cincinnati and will be another big boost for commercial aviation.

Chicago, Ill.

By Otto Klein

The International Eucharistic Congress held in Chicago during the week of June 21, turned out to be one of the biggest gatherings the city has witnessed since the World's Fair, and naturally did not fail to bring with it considerable airplane business.

The last day of the Congress especially, being held at Muendelein, some 40 miles from the city, brought a number of planes into service carrying passengers, newspaper men, photographers, etc., back and forth. In all, some fifteen planes landed at Muendelein.

Ed LaParle made six trips, carrying, on two trips, a traffic

THE NEW SUPPLEMENT -

Contains Over 450 Illustrated Airplane Parts

HASKELITE AIRCRAFT PLYWOOD
PAGE 15 OF OUR CATALOG
Listing instruments, dural sheets, dural tubes, dural rivets,
screws and bolts, airplanes, motors, aluminum, sheets, tubing, rivets, pulleys, strainers, fittings, fabric and tapes and over
AERONAUTICAL SUPPLIES
ABOVE ALL
Johnson Airplane & Supply Company
DAYTON OHIO
CATALOG No. 7
A New Safety Belt for $3.00
Fastens across lap or over shoulders or both. Prevents head from going forward—Positive lock yet releases instantly.
FROM A PAGE IN OUR SUPPLEMENT

5000 Other Aeronautical Items

Johnson Airplane and Supply Company

900 SO. LUDLOW ST.

DAYTON - OHIO

THE NATIONS AIR CENTER

expert who made a survey of the road conditions between Chicago and Muendelein. LaPierre Cavender also made several trips, as did Michael Rubner, Yackey and others.

On Sunday, June 20, the Aviation Post of the American Legion held a "Poppy Day" and three airplane rides were offered as prizes for the three girls selling the largest quantity of poppies. Michael Rubner had the pleasure of showing the girls what a good time could be had in the air. Two other girls also went up at the same time. The Aviation Post is at present forming a ladies auxiliary. They will meet at the Terrace Garden.

The Heath Airplane Company is still busy with students and has soloed several of them lately. Phillip Youngdahl has put in considerable hours since his solo and last week made his F.A.I. test. The Heath Company sold several planes during the last two weeks. They sold one new Jennie to K. B. Ross, of 1618 Howard Street; one Standard to Ostrim and Prosser, two of their students; one Standard to Walter Barelae, another student; and one Hisso Standard to Emillio Carranza of Mexico City. Carranza flew the machine back to Mexico in company with his brother, but was overtaken by a hurricane in Oklahoma and forced down, damaging his plane and, according to news dispatches, putting himself in the hospital.

Since the establishment of the Chicago Municipal Airport at 63rd Street, the City has authorized the Air Board to issue certificates of competency to pilots, and allow only such pilots on the municipal field that hold such licenses. The chief requirement is that a pilot must have 250 hr. experience. In addition, he must have a clear record and good references. This is deemed sufficient to determine whether a pilot can fly safely.

The city will not permit any airplanes to be kept at the field in open storage, but will, for a consideration of $250.00 a year, assign a place where a hangar may be built. Such hangars must be of permanent design and it is recommended that the plans of the City Engineers be followed. Bill Sivert, North Side Agency for the Wills-St. Clair car, is at present constructing such a hangar at the Municipal field. This hangar is entirely of concrete and steel construction and is 80 x 140 ft. in size, with no pillars or other obstructions. It is equipped with steam heat, showers, toilets, light and every modern convenience. Work is now under way to increase the main runway at the field to 5,280 ft.—exactly one mile. Several smaller runways will branch off from the main runway and provide room for a great number of airplanes.

Hartford, Conn.

By Harry Depew Copland

This bit of news is being dashed off in time to travel to New York via the plane of the Colonial Air Transport on its opening day trip between Boston, Hartford, and New York. It is understood that pilots Wells and Thompson will fly this new air mail route, using a Fokker Universal and a Curtiss Lark to carry them over the course, which, by the way is a tough one, the kind that makes a middle-west pilot quit flying. The postal department has caused to be made special cancellation stamps to be used for one day to inaugurate the event of the opening of this route.

We now have a lunch room at Brainard Field presided over by Mrs. P. H. Spencer, wife of pilot Spencer, in their new field-side bungalow. It is rumored hereabouts that Spencer is teaching his sister-in-law, Miss Ethel Reardon, to pilot a Waco.

Captain Berry, who, it is understood is to attempt the crossing of the Atlantic with Fonck this summer has been a recent visitor to the field with Pilot Bergan in the Sikorsky Oriole job.

Several members of the Connecticut and Massachusetts National Guards, including the writer, attempted to get through to the Miller Field meet by air, but were thwarted by a rare combination of fog and thunderstorms which made it neces-

Learn to Fly

$100 — Including Solo

No bond required
No charge for breakage

76 Students Graduated in 1925

Eight years without an accident

Room and board near field at $10.00 per week.

We guarantee to solo our students regardless of the number of flying hours required. We also furnish planes at very reasonable rates for those who wish to qualify for the F.A.I. pilots certificate and we maintain an employment agency for our graduate pilots.

The flying school of the Robertson Aircraft Corporation is one of the oldest and best known in the United States. Our instructors are ex-army aviators and are mail pilots with wide experience and our training equipment is the best obtainable. In over eight years of operation our students have never damaged a ship in their solo flights.

The flying field is approximately six miles from St. Louis and is easily accessible by railroad, street car and hard surfaced roads. It is the largest and best privately owned field in the country and the International Races of 1923 were held there. Mail planes arrive and leave daily.

Our course requires about two weeks, depending on the individual, and after its completion the refinements of the art can be gained only from experience. Commercial aviation is a rapidly growing industry. Don't delay! Enroll now!

It is not necessary to purchase an airplane in order to take this course.

WRITE FOR BOOKLET

Guaranteed Condition Airplanes, Ready for Immediate Fly-Away Delivery, at Prices Ranging from $650.00 to $1,750.00

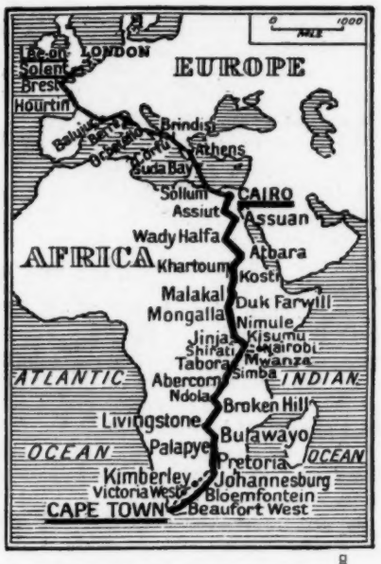
ROBERTSON AIRCRAFT CORPORATION

OPERATORS OF ST. LOUIS-CHICAGO UNITED STATES AIR MAIL

LAMBERT-ST. LOUIS FLYING FIELD, ANGLUM, MO.

Cairo-Cape-Cairo-England

"The most practical and solid achievement yet achieved in World Aerial travel." *Daily Telegraph* 22 : 6 : 26



Four Royal Air Force Fairey machines fitted with NAPIER engines fly 56,000 miles.

"NEVER before have a number of aeroplanes, flying in company, carried out without a hitch an extended journey over continent and ocean, over high land and low, and in great temperature contrasts.

The four British machines which landed here (Lee-on-Solent) to-day had flown 14,000 miles without any trouble of any nature to cause delay, and *without engine renewals or stoppages, or worry of any kind.*

The engines were Napier Lions, and it is a point of interest that all the escort machines also were Napier driven.

The four machines covered an aggregate of 56,000 miles without mishap, and it is noteworthy that the high altitude aerodromes at Tabora, Johannesburg and Buluwayo, where the air is so thin that it seriously impairs efficiency of engines and planes, gave in this case no trouble." *Daily Telegraph*, 22nd June, 1926.

For consistent reliability and efficiency install the

NAPIER

The finest Aero Engine in the World

D. NAPIER & SON, Ltd., ACTON, LONDON, W.3

sary to return to Brainard Field.

Pilot Charles Descomb had his motor cut out while testing a Standard recently, and was forced to pancake into some trees, washing out the ship. No one was hurt. A weak landing gear strut gave Johnny Ludig a spill in a Curtiss Oriole at New Milford. Ludig discovered that one of his strut fittings was broken, after getting into the air and attempted a one wheel landing, with success until just before the plane came to a standstill.

Young Mr. DuPont parked his Wright Buhl-Verville at Brainard Field during Yale commencement exercises. "Wonderful ship", sums up the comments heard.

The Pratt & Whitney Aircraft Company has increased its Board of Directors with the following new members:

G. S. Rentschler, Vice-President of the National City Bank, New York; E. A. Deeds, Chairman of the Board of Directors of the Niles-Bement-Pond Company; C. F. Kettering, Vice-President in Charge of Engineering of the General Motors Corporation, Detroit; W. B. Mayo, Chief Engineer of the Ford Motor Company.

The Pratt & Whitney Aircraft Company has had several visitors, among them being Orville Wright, the pioneer aviator, who was very much pleased with Hartford's newest product.

Lieut. C. C. Champion of the Navy Bureau of Aeronautics, on his inspection trip, flew from Washington to Hartford, landing at the Hartford Field. Lieutenant Champion has used this field on several occasions and remarked that it is one of the best municipal lay-outs that he has seen anywhere.

The Wasp engine is being installed in the new Vought two-place shipboard plane which will be flown within the next month or so for a test.

The airport was aglow with the Yale-Harvard Boat Race news last week. Lieutenant Dixon carried a passenger to see the race, the Nutmeg Flying Company policed the air and the New England Aircraft Company carried the photographer for the *Pathé News Weekly*.

The new Fokker Mail Plane of the Colonial Air Lines visited the airport and those who were fortunate enough to make an inspection were most enthusiastic regarding its appearance.

Moline, Ill.

By W. B. Mueller

Neon tubes, being used for aviation illumination for the first time in the United States, were lighted at Moline airport on June 30 and five thousand persons were at the field to see the display. There are sixteen of the tubes, each of them twenty feet long. They are filled with neon gas, and when the 9600 volt electric current is turned on they cast a brilliant crimson glare that can be seen for miles.

Government observers are coming here with a captive balloon to make official tests with a view to determining whether the new lights would be valuable to help aviators find their bearings during fog, which they are designed to do. The total illuminating power of the tubes is 14,400 c.p. It will be necessary to wait until a fog before a conclusive decision can be made as to their value.

Leo Beck, Pilot E. K. "Rusty" Campbell and the writer went up in a new Waco airplane shortly after the tubes were lighted to see what they looked like from the air. Mr. Beck is a New York engineer who was in charge of installing the tubes.

Although there was no fog during the night flight, there was a haze that fell moderately heavy on the horizon and extended upward some hundreds of feet. At an altitude of 1500 ft. the small white lights on the flying field were considerably dimmed, but the neon tubes on the tower seemed to blend together and the effect was very striking. One could hold his hand out of the cockpit and the red light made the hand crimson. The underside of the top wings was tinged red when not directly over the tower and it may be that the bottom of the lower wings was colored red all the time.

Smoke and the haze were colored red by the lights directly over the tower and at some distance on either side. This coloring effect extended upward to a distance which I estimated at 1000 ft. and it might have been considerably more had the haze blanket been thicker.

This is hardly a fair test of the tubes because visibility was

RYAN M-1 $2890 to $8400

Superior Performance with
Super-Rhone, Curtiss OX5, Hispano-Suiza and Wright Whirlwind.

RYAN AIRLINES, INC. San Diego, Calif.

"The Plane That Pays A Profit"

THE NATIONAL AERONAUTIC ASSOCIATION

1623 H Street, N.W. Washington, D.C.

Solicits the Cooperation of

ALL AMERICANS WHO DESIRE TO MAKE AMERICA FIRST IN THE AIR.

We seek, by the promotion and encouragement of civil and commercial air navigation, to contribute to national progress and prosperity and to increase the military safety of the country without giving cause for international jealousy or fear.

DOPES

PIGMENTED DOPES
VARNISHES ENAMELS

TITANINE

MADE BY
TITANINE, Inc.
UNION, UNION COUNTY, N. J.

Contractors to U. S. Government

fairly good at all times.

The theory is that red rays of light are of a different nature than other colors and penetrate fog with comparative ease while other rays would be reflected or diffused. The sun appears red at sunset, I am told, because the red rays of the solar spectrum penetrate the smoke, mist and clouds while the other rays are diffused or reflected. Thus, when a pilot is lost in a fog over Moline airport, it is hoped, the red rays cast by the neon tubes will penetrate the fog and enable him to take his bearings to locate the field. If he knows the size of the field and on what part of it the tower is erected, he can make a fairly safe guess as to where to land by using his compass and altimeter. At any rate, it might be better than making a blind landing anywhere and taking a chance of cracking up against the walls of some farmer's cowshed.

The lights were installed here by cooperation of the Campbell-DeSchepper airplane corporation and the National Air Transport, Inc.

Oklahoma City, Okla.

By Guy P. Webb

Establishment of Oklahoma City as a station on the N.A.T. Chicago-Dallas mail route was the beginning of a stimulated interest here in aviation. Before the coming of the air mail, a few hobo pilots flew vagrant planes around the city's two airports, the Bob Tarbutton field and the field used by Burrell Tibbs for a flying school.

The Tibbs field is now the municipal field. It is five miles Southwest of the city, within 15 min. motoring distance of the center of town. The N.A.T. station and hangar are on the West end of the field.

The most recent development near here in aviation is the organization of an air transport company in Norman, home of the state university. Norman is 20 miles south of Oklahoma City.

B. S. "Chebie" Graham, an ex-Army pilot, accompanied by Mike Monroney, *Oklahoma News* reporter, landed on the municipal field, Tuesday, June 22, in a new Waco 9.

Graham and Monroney went by train to Troy, Ohio. They flew back to Chicago, then over the N.A.T. route to Oklahoma City. Monroney wrote a series of stories, "On the Trail of the Air Mail," which appeared in *The Oklahoma News*.

Luther K. Bell, traffic manager of N.A.T., was in Oklahoma City, Tulsa and Amarillo, the week of June 21-26, conferring with business men of these cities about the possibilities of establishing feeder routes to the Chicago-Dallas line, from Tulsa and Amarillo.

Mr. Bell, while in Oklahoma City, announced the name of the new traffic manager for N.A.T. on the southern division, Charles Brun, of Waco, Texas, who succeeds L. G. Matthews.

Loyd T. Englerth, former Federal truck salesman, is local traffic representative for N.A.T. Since his appointment, weight of outgoing air mail here has steadily increased and on Tuesday, June 22, the total weight was 32 lb., 2 lb above quota.

Akron, Ohio

By. R. L. Feezle

Stow Field, situated 6 miles Northeast of Akron, has been taken over by the Safety Airways, Inc. Gordon Lee, who served under Herbert Hoover during the war, is president, R. L. Feezle, vice-president, and John Watters, Jr., vice-president and general manager. The field is four-way, with 3,500 ft. runways and has hangars for 6 planes. Oil and straight run gasoline will be carried at all times. Recently, several Army planes have stopped over at the field for the night.

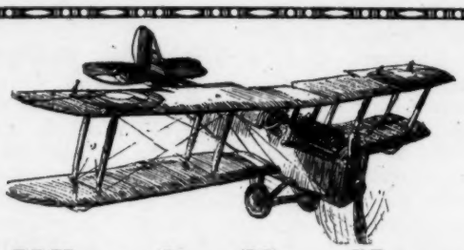
Pilot Robbins has been kept busy figuring out time for his students between rains. Wm. Jones, who has been taking some time, left with his Standard for his home at Youngstown. Milo Shorts has been running the gasoline station and has not had time to solo as yet, but he should do this little thing soon and then we will have to buy him a new hat.

Anyone visiting this territory is invited to drop in at Stow Field.

Hammondsport, N. Y.

By M. B. Scales

Airplanes beat homing pigeons in a contest held here on June 30, flying the 62 miles from Pleasant Valley aviation



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field to Auburn, in 48 min., while the birds flew a course shorter by 12 miles in 51 min.

H. C. Mummert, chief engineer of the Hammondsport Aerial Service corporation, piloted the winning plane. A pigeon owned by Robert Westover of Auburn was the first of several homers to reach its home cote after the start.

Two starts were necessary before the pigeons and planes got away to suit the judges and the pigeons appeared to be frightened somewhat by the roaring planes overhead. The starter's pistol was the signal to release the birds from baskets on the ground and to two planes flying overhead to make their start. The second plane, piloted by Lieut. W. R. Wheatley, developed engine trouble and withdrew soon after the start. Pilot Mummert's plane left Hammondsport at 9:01 a.m. and arrived at Auburn, after swinging North and East over several villages, at 9:49 o'clock. The pigeon, which left at the same time, arrived at 9:52 o'clock, checked by an automatic registering device.

Gareth Clark, son of Ernest R. Clark, head of the English Department of East High School, Rochester, makes weekly calls on Miss Charlotte Cooper of Syracuse, thereby inaugurating the fad of going courting by airplane.

Mr. Clark says he first flies over the house, which is located on Onondago hill, the topography of which prevents landing there. When Miss Cooper hears the airplane and sees its pilot, she drives out to the field in her automobile to get her visitor. The two young people have kept "dates" as regularly as if Mr. Clark's trips were made by trolley, train or automobile.

The youthful pilot is a graduate of the University of Michigan and this fall will return there for a post-graduate course in aviation engineering. He has been flying since 1923 and has made numerous trips in the two planes which he now owns. He has flown from Rochester to New York three times, making one of the trips in 5½ hr.

Cleveland, Ohio

By W. T. Whitlock

The aviation club has agreed to present to City Manager W. C. Hopkins a sheepskin citation for his efforts in the betterment of civilian aviation in Cleveland. Hopkins is a staunch advocate of flying and has done a great deal of good work in Cleveland along aeronautical, as well as civic lines. A banquet is to be held in his honor in the course of two weeks and the citation will be presented there. Incidentally, the club is growing rapidly. A few weeks ago there were approximately fifty-five members upon its roster and now over one hundred answer "Present". All of which is very gratifying. Much excitement was derived from the arrival of the club pins the other day. The pin is in the form of a shield, topped with a viking's helmet; the club's name is at the top and in the field of the pin there are the words—"Astra Explorantes", which, the writer was told, means "Explorers of the Sky". For the members who have their pilots licenses, a pair of wings will complete the shield.

The other day at the airport, Willard Parker gave a Hindoo prince the air. It isn't everyone who can do this to royalty. "Doctor" Sur Basudeb, of Calcutta, India, arrived at the field in royal splendor (royal splendor being a Yellow cab) with his wife and a bouquet of roses. By dint of many motions and much broken English, Sur (as I familiarly call him) conveyed the idea to Willard that he would like to soar, with his roses, the vast dome of the blue skies. This wish was easily gratified after the Prince had written out a check.

The Parker school is certainly doing a big business, Willard and his instructors are in the air about six hours a day. About seventy-five students are taking their course now, of which twenty-five are ready to solo.

In the Ohio Theater Lobby, where "What Price Glory?" is being played, the management has a war exhibit. All the equipment of modern warfare is there displayed. Among the exhibits, Parker has donated his parasol mono, which attracts much attention from the spectators. C. W. March has taken the plans for Parker's hangar at the airport to the city council for approval and will shortly know when they can start building.

Spencer Pennett and Charles Wethern, of Warren, dropped

Lieut. Doolittle, with Lap Pack type; Lieut. Brookley, with Seat Pack type — IRVIN Air Chutes.

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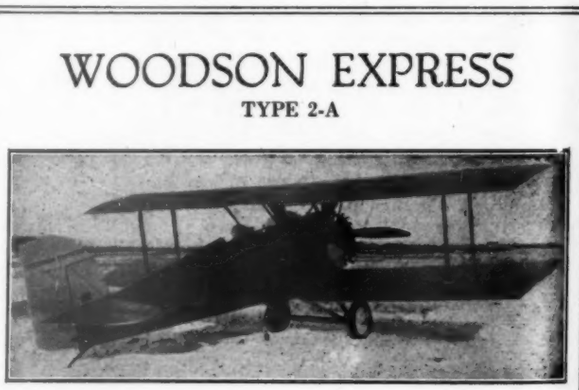

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BRYAN, OHIO

into the field last week with an OXX and a Hisso Standard. At present they are tearing the engines down for repairs. Upon completion, they plan to go to Rochester, N. Y., where they will start their season. Student work, passenger carrying, photography and aerial advertising will comprise their activities.

Shirley J. Short, of the Air Mail, threw caution to the winds and flew from Chicago to Cleveland in 109 min. The Boeing which he has been flying certainly must have been in good shape for that is speed for a mail plane.

We received a telegram from Marvin T. Mokah recently, which read—"Imperative that militia is sent to East Wallop. People are threatening to have me lynched as they can't sleep on account of the noise my non-stall engine makes. Don't delay,—matter of life and death". As it was sent collect. I have, naturally, done nothing. In a recent letter, Marvin informed me that one night he took the engine and trucked it to the city reservoir and tossed it in. The next morning he noticed that the water tasted a bit oily, and when dinner time came, the crystal clear water had a dark brown color. Marvin suspected something fishy, so to speak, so went to the water supply. In place of the usual placid surface, the water was churning about as if in agony. Futility overtook him, as he realized that his perfection was just a bit too perfected and the engine positively refused to stop. It cost him around five thousand dollars to pacify the justly angry denizons of East Wallop and to get the engine out of the reservoir. I am becoming a bit weary of his complaints as it is his own fault. If people would only let well enough alone, a vast amount of trouble would be saved. I have been wondering whether or not he had turned off the ignition. And that is, in a manner of saying, that.

Rochester, N. Y.

By Roswell H. Ward

Lieut. George W. Goddard and Dr. S. M. Burka landed at Rochester on the afternoon of June 22, after a flight from McCook Field. Lieutenant Goddard is making a trip to New York and Washington in the LePere Biplane which was used in the altitude flights by Lieutenant Macready and stopped to confer with the Research Staff of the Eastman Kodak Company concerning his plans for the use of the new infra red sensitive film for high altitude photography.

Preliminary experiments have shown that a photographic plate which is sensitive to infra red light can be used very effectively for long distance photography, being a valuable adjunct to the aerial haze filters which were produced by the Eastman Company during the war.

Gareth Clark, formerly of Curtiss Field, is continuing the operation of his own base East of the city and is doing a steady "passenger hopping" business.

The McDermott-Talaska Company at the municipal field is also keeping its planes in the air with full loads of passengers and is doing an especially heavy week-end business.

The "Crackers and Milk Club", an organization of business and advertising men recently chose "Commercial Aviation" as the subject of its lunch discussion and the writer was given the opportunity of presenting to them a brief summary of the recent trend of events in the commercial field. The understanding and interest displayed by this group should be distinctly encouraging to the commercial flier as it is typical of the wholesome respect for the possibilities of air transport which is gradually developing among the better class of progressive business men.

It is interesting to note that a few words were devoted by a few of the publicists present to the trend of aviation advertising.

Department Store Exhibits Plane

The three-engined monoplane Josephine Ford, with which Lieut. Comdr. Richard E. Byrd and Aviation Pilot Floyd W. Bennett flew over the North Pole, has been assembled in the central court of the new building at John Wanamaker's, New York, where it will remain on public exhibition for several weeks.

Rodman Wanamaker has long been interested in aviation

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Acetate Nitrate **DOPES** Clear Pigmented

4-C PIGMENTED FINISH NITRATE DOPE
Used in 3 or 4 BRUSHED coats without clear under coat. Beautiful Smooth Finish. Most Economical and Attractive Finish Known. Spraying not necessary. Entirely new development. All Colors.

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because you are not a regular subscriber, may contain the article, news story, picture or advertisement which you could have used with profit.

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AVIATION

The Oldest American Aircraft Magazine

The Only American Aircraft Weekly

and before the war the Curtiss Company built for him a giant flying boat with which it was hoped to fly across the Atlantic. The Wanamaker Stores have on several occasions exhibited planes and have obtained a considerable amount of publicity from the exhibits and, in return, have familiarized the visitors with the appearance and working of different types of planes.

Denver, Colo.

By J. A. McInaney

The Mile High Air Meet is the central topic of conversation around here and will be until after Aug. 3. The Committee is going to make this meet a success from the pilots standpoint and have made arrangements for reduced rates at Denver hotels and restaurants.

J. V. C. Gregory from Picher, Okla., dropped in in a New Swallow at the Colorado Airways on his way to Cheyenne.

J. Don Alexander and Paul Vernier have just returned from the Pacific Coast where they established two agencies for the sale of Eaglerocks. J. A. McInaney and Wm. J. Gorman have returned from a similar trip in the East. They also established an agency in Niles for Michigan and in Gary for Indiana.

Police Officer George Roberts has returned to Denver from Brooks Field where he received his wings.

Morton Fleming, young lumberman, is flying daily in his new Eaglerock and is converting a number of his friends to flying instead of golf.

Naval Reserve Aviation Division

The 3rd Aviation Division V.T. Squadron 30 has been organized in the Fourth Naval District with headquarters at the Naval Aircraft Factory, Navy Yard, Philadelphia, Pa.

(c) R. P. Beebe

A Douglas landing at Crissy Field, Cal.

This is the first step toward the establishment of a naval reserve aviation division and planes have been made for the training of a quota of reserve student aviators. Ground school was started early in May and two hour lectures are held each Friday evening in (Bldg. 58) one of the hangars at the flying field.

So far no definite assignment of planes for training purposes has been made but it is hoped that the Navy Department will be able to arrange for primary flight training for this division at a local flying field.

Similar units have been established in other Naval Districts and much interest has been taken in the flight training given these reserve student aviators.

The present schedule for ground school instruction embraces lectures on Aviation Indoctrination and History, Theory of Flight, Flying Methods, Structure and Rigging, Aviation Gunnery, Bombing and Bomb Furniture, Aerial Navigation, Aviation Engines and Parachutes.

Upon completion of ground school it is planned to give the students who qualify primary flight training and advance training at the Air Station, Hampton Roads, Va. This advanced training will take about forty-five days and upon satisfactory completion of the entire course the successful students will be commissioned as Ensigns (A.V.) U.S.N.R.

The Aviation Ground School is in charge of Lieut. Comdr. R. H. Hedtler, U.S.N.R., Aviation Aide to Commander Hoffman, U.S.N.R., commanding the Reserve Battalion of the 4th Naval District. The 3rd Aviation District V.T.-30 is commanded by Lieut. C. K. Wildman (A.F.) U.S.N.R. Any men interested in obtaining flight training and commissions in the Naval Reserve Aviation Division should make application to Lieut. Wildman, Fourth Naval District, Navy Yard, Phila., Pa.

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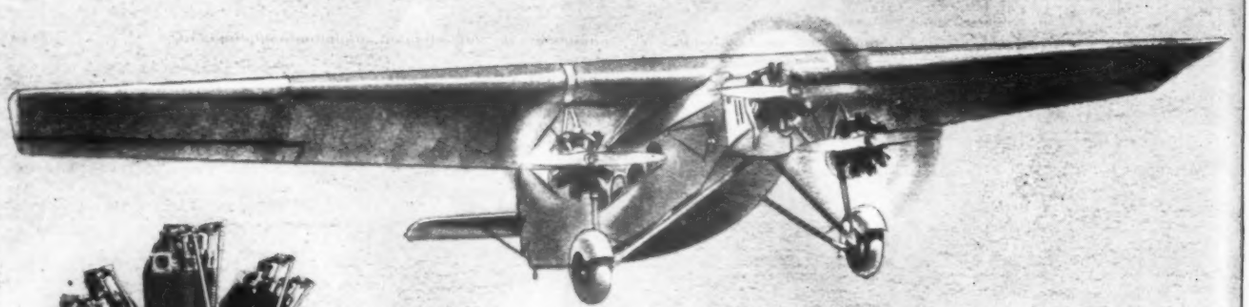

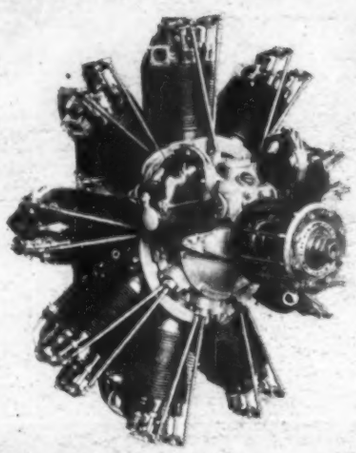

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